MOTOR AGE

Vol. XXXI
No. 9

CHICAGO, MARCH 1, 1917

Ten cents a copy
Three dollars a year

You Can Take Hills on High Without A Knock

If you will keep your car free from carbon. For 25c—five minutes' time and with no labor, you, yourself, can remove all carbon deposits with

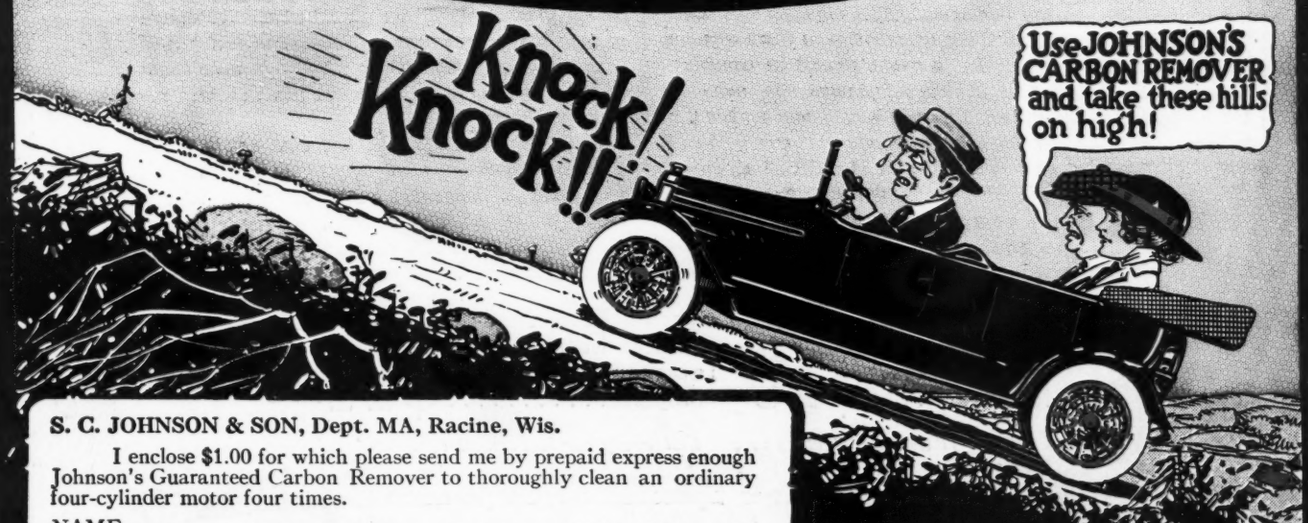
JOHNSON'S CARBON REMOVER

a harmless liquid. Pour an ounce into each cylinder—allow it to remain from two to twelve hours. Then start your engine and drive 10 or 15 miles. You will be surprised at the increase in power and "pep".

How It Works

Johnson's Carbon Remover does not eat the carbon, but releases it from the metal and softens it into a jelly-like, inflammable mass. Then, as the engine is operated, the mass burns, pulverizes and is blown out through the exhaust in powder form. The make of car—old or new—makes no difference. No matter how badly carbonized a car may be, **Johnson's Carbon Remover** will do its work perfectly.

If your dealer cannot supply you, use the attached coupon.



S. C. JOHNSON & SON, Dept. MA, Racine, Wis.

I enclose $1.00 for which please send me by prepaid express enough Johnson's Guaranteed Carbon Remover to thoroughly clean an ordinary four-cylinder motor four times.

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ADDRESS .....

CITY ..... STATE .....

MY DEALER'S NAME IS .....

Made and Guaranteed by
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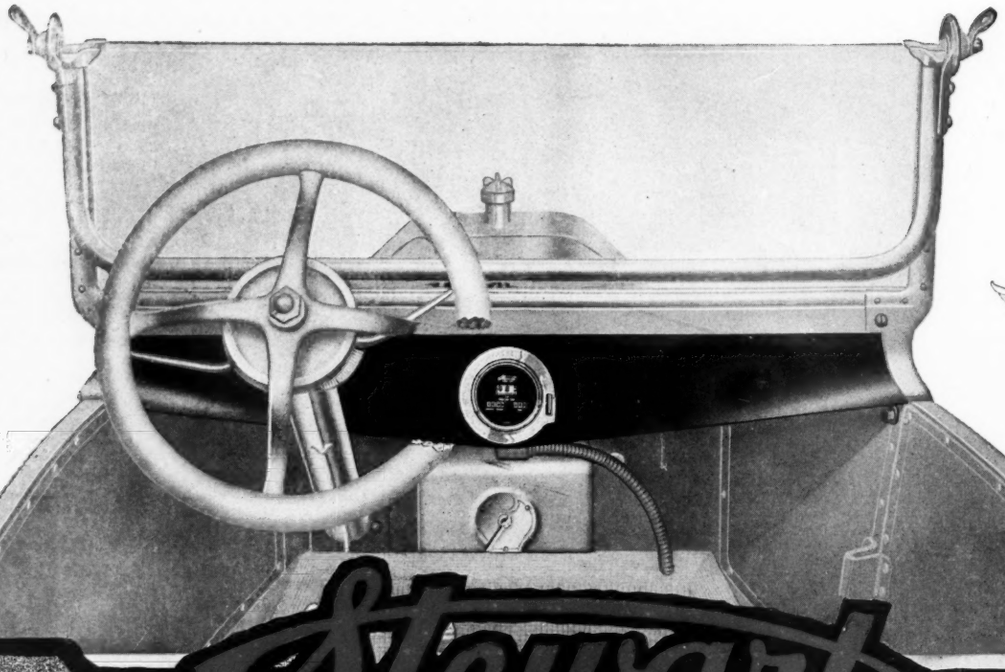
Editorial Contents—Page 3

Advertisers' Index—Next to Last Page

In This Issue—The Mayor of Junkville



Stewart PRODUCTS
PRESTIGE QUALITY SERVICE SATISFACTION
U.S.A.

Stewart INSTRUMENT BOARD for FORD CARS

Biggest Opportunity Ever Offered to Dealers

THE new Stewart Instrument Board offers a bigger opportunity to dealers than any accessory ever presented.

This new Stewart Product opens a new field—now every dealer can start right in and make a good profit selling accessories to Ford owners.

The Stewart Instrument Board in combination with the Stewart Speedometer sells on sight—every Ford owner wants one on his car.

Improves the appearance of every Ford. Gives the Ford car a look of finished elegance.

Besides, it brings the Stewart Speedometer up into the correct position where it can be easily seen and read.

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The Instrument Board is beautifully finished in black enamel, with a polished nickel flange to set off the speedometer. Anyone can install it in a few minutes—simply remove nuts from four screws; set the Board in position and replace the nuts.

Can't you see, Mr. Dealer, that every Ford owner who sees this beautiful combination will want it instantly? Suppose you order a supply at once. The demand is very big now. You have only to show it to a Ford owner and the sale is made.

The special Ford model Stewart Speedometer sells for..... $10

Special Ford model Stewart Speedometer with Stewart Instrument Board complete..... $11.25

"It will pay dealers to see that every car is Stewart-equipped"

Stewart-Warner Speedometer Corporation
CHICAGO, U. S. A.

MOTOR AGE

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Vol. XXXI March 1, 1917 No. 9

Contents

THE MAYOR OF JUNKVILLE..... 5
The village is the salvage department of the Goodrich company.
IN WAR'S COUNTRY..... 9
CAR SITUATION RELIEVED..... 10
EDITORIAL—RACE DRIVERS IN WAR TIME—NATIONAL DEFENSE AND ROADS..... 12
RICKENBACHER IS BACK..... 16
USED CAR PLAN DROPPED..... 18
LAUNCHES IOWA BUYING..... 20
REGULATES STATE TRAFFIC..... 22
THROUGH THE WILD AND UNTAMED LAND OF MANANA 24
MANIFOLD IMPORTANCE INCREASED..... 27
What carbureter experiments show.
ELECTRICAL EQUIPMENT OF THE MOTOR CAR 32
MAKING THE FORD CAR FAST..... 34

DEPARTMENTS.

FROM THE WOMAN'S VIEWPOINT..... 28
MOTOR CAR REPAIR SHOP..... 37
READERS' CLEARING HOUSE..... 38
THE ACCESSORY CORNER..... 44
FROM THE FOUR WINDS..... 46
AMONG THE MAKERS AND DEALERS..... 48

ANNOUNCEMENT.

Next week's issue will contain, among others, a feature story on planning for the spring touring. If you are following the touring issues as leading to the annual touring issue April 5, this should put you that much more in the humor of motoring afield.

Save the Casing

You can't afford to drive on improperly inflated tires.

More cars every day are adopting the Kellogg Engine Driven Tire Pump. "No oil with the air" guaranteed as standard equipment.

KELLOGG Engine Driven Tire Pump

If your car does not have it your dealer can put it on. The pump with ready-to-attach fittings costs but little and saves a great deal in tires.

Send name and model of car for full particulars.

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Is Your Car Here? Regular or Standard Equipment?
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Then We Have Special Equipment.

Studebaker
Established 1852

The Industry Itself Proves Studebaker Superiority in POWER

From the analysis given in the leading Automobile Journals of 179 makes of cars on the 1917 market—this fact is brought out.

There are a few FOURS that equal the Power of the Studebaker FOUR at $940 but they are so much higher in price that they average $2753—$1813 more than Studebaker.

The Studebaker "Six" costs $1180. The few other Sixes on the 1917 market that equal it in POWER are such expensive cars that they average $4078 in price—$2898 more.

Here is *one* of the reasons for the amazing sales increases reported by Studebaker dealers—they have a greater value to offer in POWER.

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The car that the Studebaker Dealer sells combines more of the most popular and saleable features than any other car—at a price that makes it the great value of 1917

It pays to be a Studebaker dealer

Vol. XXXI, No. 9 March 1, 1917 $3.00 per Year

MOTOR AGE

The Opportunity Shop conducted by the salvage department of the Goodrich tire factory is only ten months old, but it has proved profitable already

The Mayor of Junkville

by Allen Sinsheimer

IF YOU will walk through a half dozen of the seemingly endless rows of streets in the Goodrich tire factory at Akron, enter the door to old mill No. 2, pass up the stairway, turn to the right, and set foot in the office—you will find yourself in the legislative quarters of Junkville, the city where junk is the medium of financial exchange. If you are fortunate or have an appointment, you behold a gentleman of medium height, pleasing countenance and keen eyes sitting at the desk. He is Mayor of Junkville and has considerable need for those keen eyes.

Not Junk to Him

To him there is no such thing as junk. Discarded materials become articles for conversion, repair, refining, manufacture and sale. His duties consist of taking anything no one else wants and making everyone else want it—and when you understand that he handles 3000 tons of discard and converts it into 1,300,000 dollar bills every year, you realize that being Mayor of Junkville is no mean job.

The salvage department at the Goodrich plant is of vast importance, and George W. Sherman, its manager, holds a scrap, waste and junk record that stands alone. Salvage work requires thrift, and he possesses that quality in quantities. He is a descendant of New England Yankees and thus comes of the saving propensities honestly.

Several months ago he was walking through the basement of the hard rubber department and his keen eye detected an out-of-the-way corner full of metallic antimony.

"Have you thrown all that aside?" he asked the foreman.

"Sure," was the reply. "That is all useless to us. We've got a lot more of it."

A little investigation revealed the truth of the statement. The department had vast quantities of the material and no use for it.

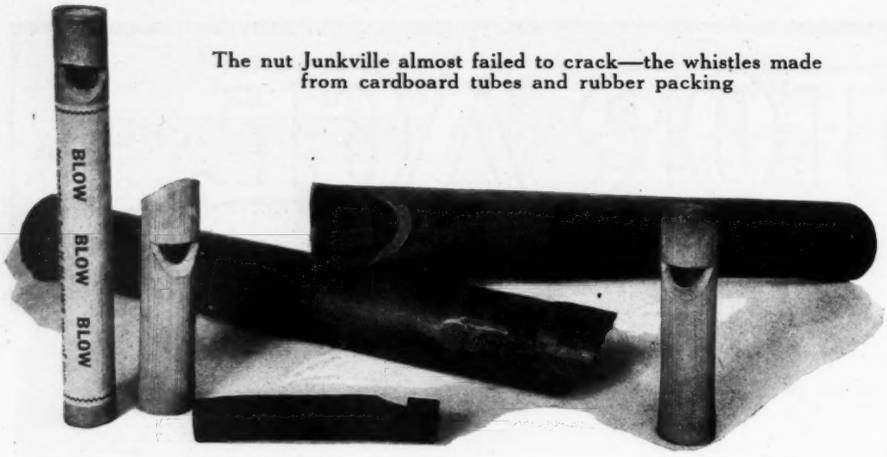
"How much did you pay for it?" asked Mr. Sherman.

"About 9 cents a pound."

"The salvage department will take it over from you at that price," he offered.

The salvage department did take it over and sold it at between 40 and 48 cents per pound, which, since there were several tons of it, swelled the Junkville earnings perceptibly.

That is one example of how the Mayor



The nut Junkville almost failed to crack—the whistles made from cardboard tubes and rubber packing

of Junkville works. He is a sort of chief inspector of corners and useless stuff; in fact, he can detect scrap and waste with greater speed than the magnetic needle locates the north pole. When he finds salvage his smile is much like the expression of the financier who plays with the bulls when the bears go down to defeat.

Eight years ago Mr. Sherman handled the by-products of the Diamond Rubber Co. and when that organization was taken over by Goodrich he went with it. He found Goodrich salvage under the direction of the purchasing department. It earned something like $2,000 a year. The salvage department, re-organized under his supervision, netted $90,000 the first year of his direction. Last year Goodrich received a net profit of $140,000 besides securing a hundred other benefits from Junkville.

The department is omnivorous. It handles rubber, paper, rags, lumber, boxes, unsalable goods and a thousand odds and ends, including discarded machinery and test cars. It is the material cesspool of the place. It occupies 80,000 sq. ft. of floor space including a six-story factory, employs more than 200 workers, uses several motor trucks and much mechanical equipment and occupies a suite of offices crowded and busy. It pays larger dividends in proportion to space, men and equipment than any other single Goodrich department.

Business Blazed Own Path

With no precedents to guide it, the business has blazed its own path from an insignificant beginning to its present proportions, and the journey has been made over a thousand obstacles.

Many officials, viewing the scrap and waste with disdain, ridiculed the work. Recently, a company officer, ignorant of the methods or the results, walked about the factory, pointing out numerous small stacks and said, "Surely you don't bother with all those little things." He learned that this is the very foundation of junk reclamation—that big profits are secured only by bothering with little things.

A few years ago, solid tires were made with wire mesh bases. Many were returned for guarantee adjustments and other reasons. The available rubber was cut from them, sold and used for various purposes. The rubber and wire mesh bases were carelessly thrown to one side— useless. The Mayor of Junkville spied them. He visited the head of the department:

"What are you going to do with that lot of bases,"

No one knew. They were transferred to Junkville and lay idle, continuing to pile up until a sufficient quantity justified action. The legislative quarters gave the problem consideration. A machine was devised, comprising a powerful mill and huge magnet. The bases were ground to small pieces. They were next crushed into powder. The magnetic separator sorted the rubber from the metal. A dealer paid $5,000 for the rubber and $750 for the metal, and another of Junkville's little things paid a big Goodrich dividend.

Many buyers, eager for large profits, have sought to take every possible advantage arising from the department's original ignorance of paper, rubber and rag grading. It was found that the buyers usually made purchases of rags on damp days and claimed a large deduction of weight for dampness. Tests proved that the deduction claims were exorbitant and it was ruled to sell rags only on dry days.

This rag business totals to extraordinary figures. Cloths used for protection of uncured sheets of rubber, fresh from the calendar rooms, and those which serve as wrappers for tires undergoing a cure aggregate from 6 to 7 tons a day. They were formerly sold in bales at $13 a ton. Gradually, the department learned the various grades and sorted them, increasing the price to $15 a ton, an economy of $4,500 a year.

When Junkville first handled waste paper it, too, was sold in unsorted bale lots at $3 to $4 per ton. Men soon learned the forty different grades of waste paper. An average of each grade was taken, and with this specific knowledge the price was raised from $3 or $4 to $6 to $15 a ton.

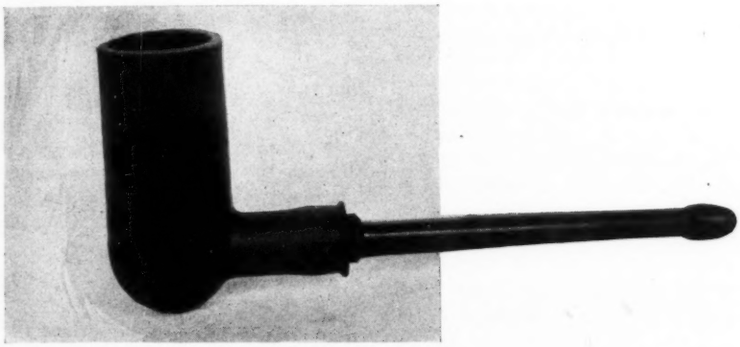
These are but a few of the articles salvaged. There are probably 500 others. Years ago steel-studded tires were made and discontinued. They were cut up and the rubber removed, leaving the studded treads regarded as more waste. Junkville absorbed them. Shoes were made by its order, in the Goodrich shoe department, and the studded treads were cut up for soles, attached and made splendid baseball and golfing shoes.

Used Unsalable Products

Several thousand rubber spark plug protectors had been manufactured but did not sell. There were numerous straight hard-rubber nozzles, ¼ in. thick, manufactured some years ago and considered unsalable. The salvage department connected the nozzles to the protectors and converted them into unbreakable soap-bubble pipes.

Cord tires have recently been in great demand. The cord, used for their manufacture, is purchased in huge rolls wound about slender cardboard tubes. The empty tubes soon became a mountain. They, too, found their way to Junkville. At the same time, the rubber packing department cleaned house and uncovered quantities of thin rubber packing, too old to be sold and quite useless. It, too, reached Junkville. The legislative quarters gave considerable time to that cardboard and packing. It lay idle for weeks.

Vast quantities of cord arrived daily, and the constant deliveries of the cardboard made the room resemble a cardboard factory more than a salvage department. It seemed as if Junkville had found a nut that no plan could crack. But a scheme was discovered. The packing and the



The soap bubble pipe—Junkille received thousands of unsalable rubber spark plug protectors, and many had rubber nozzles. The pipe was the result

cardboard were converted to a market value, and this is how:

The packing was cut into pieces ¼ in. long and beveled on one side; the cardboard was cut into slender tubes 6 in. long with a hole on one side; the packing was forced into the tubes with the beveled side facing the hole, and the result was a perfect whistle. Junkville now prints labels in any quantity and with any wording desired, pastes them on the whistles and sells the complete affair in thousand lots to garage owners, repair shops and dealers to be distributed as advertisements.

Likes Small Solid Tires

The salvage department likes velocipede, tri-cycle and small bicycle solid tires which are ½ in. in diameter. These are sometimes returned, or have been in stock too long to be of value. The department cuts them down to a 6-in. diameter. Next, it takes heavy discarded matting and useless lumber; cuts the matting into heavy circular disks 8 in. across, and the lumber into sticks 6 in. long and ½ in. thick. The sticks are set securely into the center of the disks in an upright position, and Junkville then takes two disks with the sticks set in them and half a dozen of the 6-in. rubber wheels and sells them as indoor quoit games for 50 cents a set.

Recently, someone discovered a number of empty carbide tanks. They were hurried to the salvage department. One of the department employes heard that farmers used such tanks to store winter apples. Many Ohio farmers now have the old Goodrich carbide tanks.

Waste lumber in vast quantities reaches the department and from it springs office fixtures, kitchen cabinets, bookcases and other articles, some being sold to Goodrich departments, the balance to the public.

Machinery is divided into two classes, one sufficiently good to warrant repair and use, the other regarded as scrap. Very little is considered scrap; in fact, many departments re-purchase some of their discarded machinery after Junkville has repaired it and the majority of the machines in Junkville's factory were created from discarded mechanical equipment.

Sweepings Have Market Value

Sweepings reach the salvage factory where many men sort the materials gathered into various classifications. All have a market value.

Uncured friction fabric arrives at Junkville in thousands of small strips. These are the trimmings the tire makers cut from the uncured tire. They are thrown together with old valve patches and discarded tire beads and passed through chemical and mechanical processes which separate the rubber from the fabric. The rubber is sold in ton lots. The cloth has been disappearing in the form of fine powder through the sewers beneath the factory. The Mayor of Junkville detected the powder about a month ago. The chemical department diagnosed it as hydro-cellulose. It is now saved and several tons have been accumulated. No one knows just what use will be found for hydro-cellulose, but Junkville will invent one, and another dividend will go to Goodrich coffers.

When studded tires became obsolete Junkville co-operated with the Goodrich shoe factory—and now sells golf and baseball shoes

Thousands of old casings arriving daily at the factory for adjustments are dismembered at Junkville, and the rubber is sold while the fabric goes to a factory department where it is cleaned, cut into small strips and sewed into the usual blow-out patch.

Several squares away from the legislative quarters is the Junkville factory, six stories high and a most unusual sort of institution—a combination of a rag menagerie, a temporary tomb for tire carcasses and an incubator where the demised odds and ends of the Goodrich plant are re-created in new shapes and forms.

Basement Is Tomb

The basement is the tomb, filled with thousands of tires that have outlived their original uses, and now await the time when they will be sufficiently large in numbers to warrant their wholesale re-incarnation in the new forms Junkville will create.

The first floor, in part, is filled with huge wire cages on wheels, each containing a different grade of rag and looking much like the varied monkey cages one sees at a zoo. The cages are wheeled to a baler, when filled, and packed for sale and shipment. In another corner is a curious home-made machine that aids the worker to cut the rubber tread from a tire. It looks and operates like a grinding stone, turning the tire set in it so that the operator can slit it with his sharp knife.

On the floor above are materials known as live storage, those articles that sell constantly and are moved daily. Paper and sweepings are sorted and blow-out patches are manufactured. A part of the floor is the re-incarnating section and includes an aspirator to separate the finer particles of the sweepings, sewing machines, lathes for experimental work and many unusual home-made instruments designed especially for salvage reclamation.

The remaining floors are used for storing those materials which have a greater market value at certain times of the year or which produce greater revenue when sold in quantities. A peculiar and important feature of salvage was expressed by the mayor when he said: "Salvage pays in direct proportion to the tonnage. Certain concerns who buy are able to pay 10 to 12 cents per pound for various grades of rubber when we have huge quantities and can only pay 4 or 5 cents when the tonnage is low. Large quantities create a use and therefore a market."

The department also handles old burlap bags, test cars, odds and ends, and operates a store. The burlap bags are cut open and cleaned and sewed again and are as good as new. The test cars are used by the company for testing the durability of tires and are usually in wrecked condition when they reach Junkville, but in many instances have been repaired and sold for $300 or $400, and at other times are torn down and sold as parts. The store, which is known as "the Opportunity Shop," sells at retail various usable articles, long since discarded by the manufacturing departments, and the bird cages, sewing cabinets, stools, doll beds and kitchen cabinets made from waste lumber. The store, though a recent institution, is already on a profitable basis.

Half Sold Outside Company

Approximately 50 per cent of the articles handled by the salvage department are resold to the company, the balance going to outside trade. The company's departments always have the option on any material or article in possesstion of Junkville.

The salvage department operates in a way calculated to keep the sales forces constantly on edge. Every material or article which has been received at a previous time from a manufacturing department, and which has a known junk value, is billed to the salvage department at the price for which it was last sold by Junkville. This forces the salvage salesmen to continually seek a higher selling price which will obtain for the department a profit considerably higher than the price that was received in the last sale of the same goods,

so that the new return will display the usual department earnings.

To do this the department makes an estimate of 20 per cent above the cost for overhead and another 5 per cent for profit and then seeks a market which can pay that sum. For instance, the paper box department of the Goodrich plant recently sold Junkville some scrap boxes for $2.40 a ton. Junkville sold them for $9 per ton, and when it next received scrap boxes from the paper box department was forced to pay $9 per ton for them. Thus, the salvage department, adding 25 per cent, will be forced to find a market for the scrap boxes which will pay $11.25 per ton for them.

With new articles or materials the procedure is somewhat different. It is here that Junkville converts the discard into those thousands of dollar bills of net earnings. When a manufacturing department discovers some unsalable article or useless material which Junkville has never handled before, such goods are billed to the salvage department at whatever the seller thinks they are worth. Frequently the cost to Junkville, as with the metallic antimony, is 20 per cent of the selling price.

Delivery at Door

All waste materials and other goods consigned to Junkville, are delivered to its door, much like in any other business where the seller makes the delivery, and Junkville in turn delivers whatever it sells to the door of the department making the purchase.

The sales organization of the salvage rooms is divided into classifications. There is one salesman to each branch and the branches include:

a—Metals, waste paper and test cars.
b—Opportunity shop.
c—By-products and chemicals.
d—Special lots.
e—Machinery, lumber and boxes.
f—Special lots.
g—Job lots.
h—Rags, old shoes, soles, leather and scrap belting.

The majority of the sales are made by correspondence, advertising, personal calls and catalogs. The job-lot salesman travels through the country and calls on the 5 and 10-cent stores. The salesman of scrap belting sells it to steel mills where it is used for manufacture of handles for hot steel and to shoe factories who use it for making shoe soles. The old shoe business is a surprising one.

Many of the 18,000 Goodrich workers leave their old shoes about the factory. These are gathered up and sold in carload lots at $12 a ton, and there are many tons within a year's time. Many dealers come to Akron for the sole purpose of making purchases at Junkville or to secure options for the year's output of certain materials and these to a certain extent lessen the need for traveling salesmen.

Sales Swamp Expenses

The office is operated by an extremely efficient yet simple system. A huge rack filled with cards is close to the main desk. The cards are about 8 in. by 10 in. and have noted on them the past selling prices, past quantities, empties, reclaimed goods, confidential data and other similar information, and are kept up-to-date by two clerks. Another cabinet holds the various option copies, and a third is filled with samples of the different materials which are for sale.

The salvage department's cost of operation for the first 6 months of 1916 was:

Shop expense	$29,000
Sales expense	3,900
Total labor	49,000
Total expense	$82,000

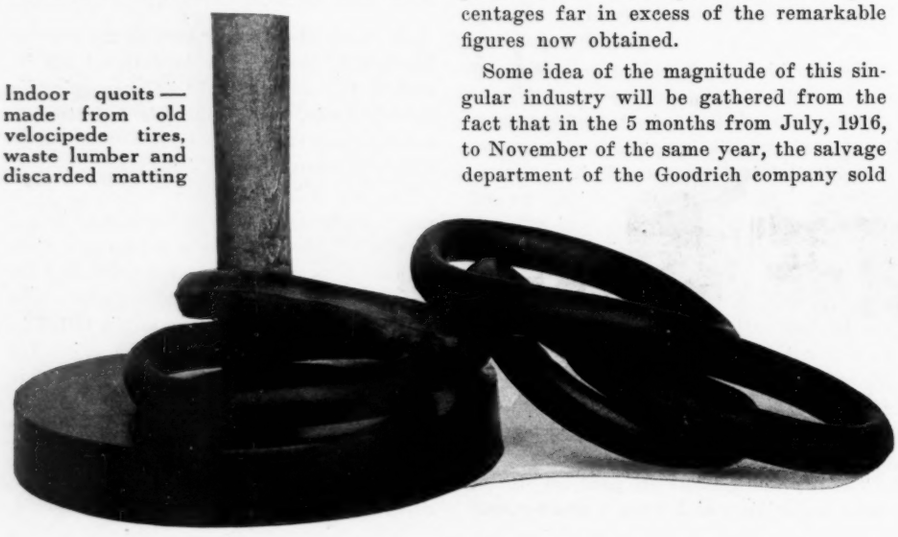
Sales for the same period amounted to:

Outside sales	$232,000
Department sales	369,000
Total sales	$601,000

Which displays that the overhead is actually lower than 20 per cent, and that a vast amount of goods sold is probably to be classed with the new materials which the department has never handled before and on which the huge profits are made. Considering the fact that the sales price from the manufacturing departments to Junkville constantly increases as the latter obtains higher prices from outside markets and is, in consequence, continually eliminating the profit of the salvage department, it can be seen that under original prices the net earnings would rise to percentages far in excess of the remarkable figures now obtained.

Some idea of the magnitude of this singular industry will be gathered from the fact that in the 5 months from July, 1916, to November of the same year, the salvage department of the Goodrich company sold 5,393,456 lbs. of rubber, rags, metals, paper, machinery and useable goods, 15,153 bbl., 8,637 boxes and 64,142 bd. ft. of scrap lumber, and that the total business done during the last 6 months of the year amounted to between $700,000 and $800,000.

There are innumerable advantages accruing to the company in addition to the huge profits. With waste paper and rags removed daily from the various departments, insurance rates have been reduced to a minimum. The floor space of busy rooms has been increased since it is no longer needed for scrap and junk. And the last but not least important factor is the remarkable assistance which Junkville renders to the purchasing department. Every article or material that passes through Junkville to the shrewd buyers from outside markets has been graded, sorted and valued. And at any time the purchasing department of the Goodrich plant is in doubt of the durability or grade or claimed value of any goods it may be purchasing, reference to the salvage department may be depended upon to reveal the actual conditions.



Indoor quoits — made from old velocipede tires, waste lumber and discarded matting

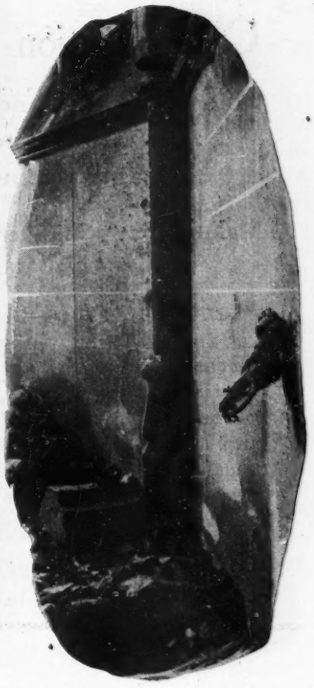
DAYTON HEADS AJAX SALES

New York, Feb. 23—F. E. Dayton has become general sales manager of the Ajax Rubber Co., following the retirement of J. C. Matlack, whose resignation was accepted last week at the annual meeting of the company. Mr. Dayton has been associated with the Ajax company for 4 years and has been assistant in charge of the tire sales. Previously he was sales manager of the Columbia Motor Car Co., Hartford, and branch manager in Boston and Chicago for the Electric Vehicle Co.

Mr. Matlack, who was secretary and general manager, has been a prominent figure in the tire industry for the last 15 years and has been connected with the Ajax company for the last 8 years. He entered the tire business as president of the International Automobile & Vehicle Tire Co., Middletown, N. J. He will take a few months' rest, after which it is expected he will announce his plans for the future.

STATE PLANS FEDERATION

Springfield, Ill., Feb. 24 — Representatives of fifty marked trail associations and motor clubs of Illinois will meet in Springfield March 7 to organize a state federation and to discuss and take action on all road matters affecting the motorists of this state. Clarence J. Root of Springfield is chairman in charge of the arrangements. A banquet will be given to the delegates by the Springfield Motor Club. Addresses will be made by men prominent in the good roads movement in Illinois. There have been many marked trail associations formed in Illinois of late years, but all have been working independently of each other. It is now proposed to bring about uniformity and co-operation.

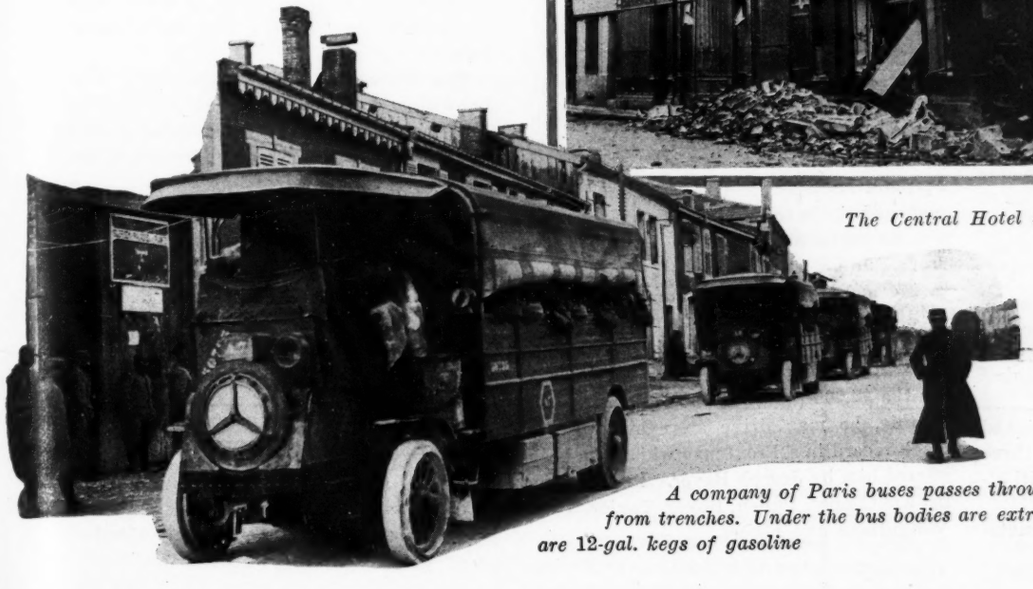


A girl's seminary at Verdun, which was destroyed by German bombardment. A curious effect of the bombardment was that the head of a saint's statue was driven into the church wall

In War's Country

A French soldier helps a native of Verdun remove his household furniture

The Central Hotel at Verdun was destroyed completely



A company of Paris buses passes through Verdun with troops relieved from trenches. Under the bus bodies are extra kit boxes, and by the drivers are 12-gal. kegs of gasoline

Car Situation Relieved

Milder Weather and New Order Are Given Credit for Improvement

Makers Say Shipment Conditions Are Better Than Reported

DETROIT, Feb. 26—The congestion of freight cars is somewhat relieved as compared with a week ago. Some shippers attribute this to the milder weather, others to the new order whereby freight cars must be reloaded to or toward the owning roads, which went into effect last week. A few of the traffic managers believe the new rule will work harm, but the majority are hopeful for good results.

Statements to the effect that all the makers are driving cars to dealers and distributors have been exaggerated somewhat, and other reports that the companies were seeking drivers to assist them to drive cars overland are likewise untrue. The Buick Motor Car Co. and the Reo Motor Car Co., both of whom were reported in news dispatches to be in need of hundreds of drivers, state that these reports are without foundation and that they have been besieged by thousands of letters from individuals who thought the dispatches correct.

Gets Enough Freight Cars

The Ford Motor Co. has found little difficulty in getting freight cars and is able to make all necessary shipments from Detroit. The company has not found it necessary to resort to overland driving.

The Paige-Detroit Motor Car Co. finds the freight car situation considerably improved and is getting its production under way with little difficulty. The company has been driving less than fifteen cars a week overland.

The Studebaker Corp. believes the freight conditions have passed their highest point of congestion. The company is not doing much overland driving and up to this time has not been forced to tie up or hinder its production.

The Cadillac Motor Car Co. states that the situation is improved and believes that it will probably clear up from now on. The company has been driving about fifty cars a day overland to points within a radius of Rochester, Pittsburgh and Cincinnati.

The Maxwell Motor Car Co., Inc., has obtained enough freight cars to enable it to make all shipments by rail and has found it unnecessary to resort to overland driving. The company is getting all the empties it needs here in Detroit, and makes shipments promptly.

The Hudson Motor Car Co. has shipped 436 cars overland within the last three weeks but now believes conditions will allow it to lower this number.

The Packard Motor Co. has approximately $1,000,000 worth of cars on hand which it is unable to ship by rail. The company has cut down its production because of the situation and is driving as many cars as possible overland.

The Hupp Motor Car Co. is driving a few cars overland and is getting enough freight cars to handle the balance of its production, which has been reduced somewhat by the freight car shortage.

The Chalmers Motor Co. has found it necessary to reduce production and to drive about sixty cars a day to Chicago, from which point the cars are loaded on freight cars and shipped to their destination.

Dodge Bros. say that the situation is improved considerably and that more cars are being moved to and from the factory every day. The company drove 500 cars overland in one day two weeks ago and now drives about seventy-five cars a day.

Nearby cities find no difficulty in getting freight cars for out-bound freight but have had some trouble with in-bound freight and suffer somewhat from lack of material.

The Monroe Motor Co. at Pontiac, finds it can get enough freight cars to handle its production but is hampered slightly by a shortage of materials. The same applies to other Pontiac concerns.

Probably the most severe trouble has been experienced by the Reo company at Lansing, where production has been cut about 50 per cent and the majority of the cars made are driven overland.

The Willys-Overland Co. reports difficulty in obtaining sufficient freight cars but has not been forced to cut down production to any extent. The company drives about fifty cars overland daily.

HUPP NOW SHOW-TO-SHOW CAR

Detroit, Feb. 24—The Hupmobile capital-to-capital car, which recently completed its 20,000-mile journey around the United States, has now commenced another tour and will go from show to show visiting one show each week. The car is now at St. Louis and from there will go to Brooklyn and later to Boston.

ASCOT ENTRIES RE-OPENED

Los Angeles, Cal., Feb. 26—Special telegram—Postponement of the George Washington sweepstakes, which was scheduled for yesterday on the Ascot speedway to March 4 on account of rain, automatically reopened the entry list, and as a result Eddie Rickenbacher, who has just returned from Europe where he went in search of racing mounts for the coming season, may be numbered among the starters if he can get a car fast enough to make him a possible winner or placer in the 100-mile dash for the $5,000 purse. If he is unsuccessful in this, he may drive an exhibition for track record in a Frontenac which has been offered him by Joseph Boyer. In the entry list are Cooper, Pullen, Boyer, Taylor, Toft, Weightman and others.

Wisconsin Engine Adds

Output to Be Increased 50 to 75 Per Cent—Capital Now $1,000,000

Development of Aviation Engine Rapid in Last Year

MILWAUKEE, Wis., Feb. 27—The Wisconsin Motor Mfg. Co., Milwaukee, Wis., one of the largest manufacturers of motor car, truck, tractor and aviation engines in the world, has increased its capital stock from $350,000 to $1,000,000 and started work on plans for enlargement of its works at Forty-seventh avenue and Burnham street, which will make possible an increase of from 50 to 75 per cent in its output. This announcement was made today by Charles H. John, president and general manager.

The increased capital is the result of the declaration of a stock dividend of 100 per cent, in addition to the regular cash dividends, at the annual meeting of the company. The issue of $1,000,000 is divided between $700,000 common and $300,000 in 7 per cent preferred stock. The present stockholders have subscribed for practically the entire issue, and only a small part is available to outside capital.

The Wisconsin company has been overcrowded with orders for motors for many months, and has continually taken steps to increase its capacity. Orders now on the books, however, will require important extensions to be erected without delay. The aviation engine business has been developed to a large degree in recent months, following the complication of international affairs. The Wisconsin company's customers for truck, tractor and passenger car engines also have placed largely increased demands upon the plant. The last fiscal year not only has been the largest in the history of the concern, but the most profitable, due to the enlargement of the volume of trade, making it advisable to increase the capital stock nearly threefold.

The Wisconsin engine probably is best known as the fastest engine developed in America, and is the product of the genius of A. F. Milbrath, chief engineer and designer. It holds all of the long-distance racing records in its application to the Stutz car driven by Gil Anderson and Earl Cooper in recent seasons. In the Wisconsin aviation engine, Mr. Milbrath has developed the maximum of efficiency, speed and power output, and it is regarded as one of the best designs ever produced in any part of the world.

HOLMES COMPANY INCORPORATES

Canton, Ohio, Feb. 22—Arthur Holmes, formerly vice-president and chief engineer of the Franklin Motor Car Co.; Charles

Rockwell, former sales manager of the Franklin company, with George Belden and C. G. Herbruck, are the incorporators of the Holmes Automobile Co., with a $2,500,000 capitalization. As was stated in a recent issue of MOTOR AGE the company will make an air-cooled engine car and will erect a big plant in this city. The incorporators will complete the organization of the company and the sale of stock, $800,000 of which has already been subscribed for. The capitalization will be divided into $1,000,000 common and the rest preferred.

BELMONT PRODUCTION SOON

Toledo, Ohio, Feb. 26—The Belmont Motor Car Co., this city, expects to have its car in production in sixty days. The two final experimental jobs are running over the roads in the South at the present time and matters are being cleared away preliminary to a campaign for dealers and a final selection of all the component parts in the car.

The price has not yet been determined but the car is expected to sell for $1,750. It has a Buda six-cylinder engine, and some of the leading specifications are: bore and stroke, 3½ by 5¼ in.; multiple-disk clutch; unit powerplant; Hotchkiss drive; three-quarter floating axle; 33 by 4 cord tires; wire wheels; and 122-in. wheelbase.

CONTINENTAL STOCK HALTED

Detroit, Feb. 27—Special telegram—The Michigan securities commission has issued an order which forbids the Continental Motors Corp. from paying more than 6 per cent on its common stock until the $10,265,000 representing, according to the company's attorney, the value of patents, trade-marks, good will, etc., is reduced to $5,000,000. Meanwhile the company's directors are given a specified time in which to adopt the resolutions necessary to carry out the order of the commission, and its stock is not legally salable until its resolution is adopted. The commission does not, for the present, interfere with sales on the stock exchange.

The Continental Motors Corp. has asked the Michigan securities commission for a rehearing on the grounds that all the facts were not presented. The company will present the data not before available at the rehearing and is confident that the commission's verdict will be favorable. The rehearing takes place tomorrow.

TO BUILD NEW FACTORY

Dayton, Ohio, Feb. 24—The Dayton Rubber Mfg. Co. has purchased 21½ acres for a new factory, which they expect to have in operation about the first of June. The main building will be about 500 ft. long and 150 ft. wide, part of which will be one-story and part three-story. The second story will be occupied by offices, and the third floor will contain a large hall for employes and their friends. The power plant will have a separate building 70 by 90 ft.

Redden Location Picked

Directors Vote to Establish Plant and Offices at Jackson, Mich.

Briscoe Dealers to Handle Trucks Throughout Country

JACKSON, Mich., Feb. 26—Directors of the new Redden Motor Co. voted Saturday to locate the Redden plant and offices at Jackson, Mich. Redden trucks will be made here, probably with steel from Joliet mills, in which some of the directors are interested. Briscoe dealers throughout the country will handle the truck.

The company has tried to get $100,000 worth of stock subscribed at Jackson, but after $65,000 of this amount was subscribed, the sale was halted as stockholders of the Briscoe Corp. and New York and Chicago capitalists had largely over-subscribed the offer. The Redden industry will have an approximate payroll of $2,500,000 and will augment considerably the motor car industry in Jackson.

PIERCE-ARROW EARNING LARGE

Buffalo, N. Y., Feb. 26—The Pierce-Arrow Motor Car Corp. in 1916 earned over $4,000,000 after all depreciation charges. This is equivalent to $12.80 a share on the 250,000 shares of common stock outstanding, no par value, after allowing for 8 per cent dividend requirements on the $10,000,000 preferred stock outstanding. Profits of $4,000,000 in 1916 compare with $4,301,000 in 1915. Comparison of earnings in recent years is made below:

1916 calendar year	$4,000,000
1915 calendar year	4,301,000
1914, 18 months period	1,714,000
1913, June 30, year	1,464,000
1912, June 30, year	2,142,000

TESTS NEW FUEL DEVICE

Chicago, Feb. 27—To test a so-called hydro-pneumatic, gas generator, the invention of J. W. Duntley, head of the Chicago Pneumatic Tool Co., a Little Giant 2-ton truck was driven from Chicago to Des Moines, Iowa, last week, making the 393 miles on 42 gal. of fuel mixture composed of half gasoline and half kerosene. Ninety-five miles of the distance was made in low gear on account of bad roads. The truck, loaded to capacity, left Chicago last Thursday and arrived in Des Moines Sunday for the opening of the Des Moines show.

No carbureter is used with this new type of fuel generator. A primer is used for starting, and once the engine is warm the fuel mixture, coming in contact with the heated manifold, vaporizes. Water is introduced into this fuel mixture from a special tank with an atomizing attachment, and this introduction of water vapor is designed to eliminate carbon. The generator is a new product and is being tested out with the thought of adapting it to passenger cars as well as to trucks. Tests are now being made at Armour Institute. Fuel used with this generator will cost about 14 cents a gal. at the present range of prices for gasoline and kerosene. According to officials of the Chicago Pneumatic Tool Co., maker of the Little Giant truck, a passenger car which conveyed the truck to Des Moines used 2 gal. more gas on the trip than did the fully loaded truck of the half-and-half mixture.

FEATURE GAS MIXER

New York, Feb. 26—The Deppe Motors Corp. was incorporated recently with a capital of 500,000 shares, par $10, to build engines that will use any mixture of oils lighter than lubricating oils, such as distillates, kerosene, benzine, naphtha and gasoline.

The corporation will have a working capital of over $1,000,000 with no debts of any character. There are no bonds and no preferred stock. It has acquired the exclusive rights to produce the superheated gas generators and engines under the patents held by W. P. Deppe of Bayshore and this city.

The Deppe generator is a device which, by using a small part of the engine exhaust gases, makes a superheated gas of all fuel oils. The corporation will lease suitable plants, and it is intended to pursue a pure assembly method of producing passenger cars, trucks, etc. The engine will be a four-cylinder, four-cycle type.

The board of directors includes the following: W. P. Deppe, C. E. Parsons, of Parsons-Simpson, consulting engineers; N. D. Lancaster, director of the Howe Scale Co., formerly of R. A. Lancaster & Sons; M. O. Guiss, manufacturer of iron products; and R. B. Sperry, of Sperry Co., investment securities, who is offering 100,000 shares of the stock to the public.

PERLMAN SUES FIRESTONE

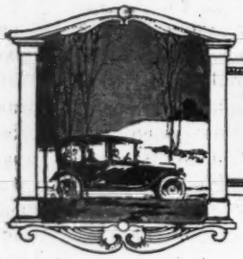
New York, Feb. 27—Special telegram—The Perlman Rim Corp. has brought suit against the Firestone Tire & Rubber Co., alleging infringement of its demountable rim patent No. 1,052,270.

BARLEY MOVES TO KALAMAZOO

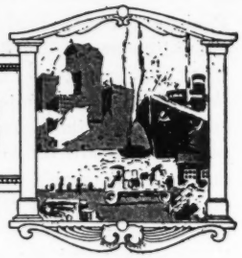
Detroit, Feb. 27—Special telegram—The Barley Motor Co., Streator, Ill., maker of Roamer, is moving to Kalamazoo, Mich., to occupy 83,000 sq. ft. of floor space of the old Michigan Buggy plant.

STEWART-WARNER ELECTS

Chicago, Feb. 27—Officers of the Stewart-Warner Speedometer Corp. have been elected as follows: President and general manager, C. B. Smith; secretary, W. J. Zucker; treasurer, T. T. Sullivan; chairman of the board, L. H. LaChance; first vice-president, V. R. Bucklin; second vice-president, W. J. Zucker; third vice-president, T. T. Sullivan.



EDITORIAL PERSPECTIVES



Race Drivers in War Time

NOW that Uncle Sam is taking such a careful census of his resources in men and materials with an eye as to how they can be best employed in the defense of the nation in time of war, it may not be amiss to observe that in our racing car pilots, it is probable that we have the foundation for an aerial fleet which would be most valuable. Those who have watched the careers of the foreign racing drivers of note since the opening of hostilities in Europe will remark that nearly every famous racing driver of the old world is serving his country in the aviation division of its army or navy. The most of these have been pilots of airplanes on scout duty and nearly all of them have been mentioned for bravery from time to time in the despatches. Others have been placed in charge of aviation squadrons. For instance Chassagne, the Sunbeam pilot, is now in charge of the Sunbeam aviation engines in Paris.

THE peculiar adaptability of a racing driver and also, to some extent, his mechanic to the piloting of airplanes in time of war is very forcibly presented by Rickenbacher, the American race driver, who has spent some time in Europe studying these conditions and whose hurried return to this country was caused by his desire to be at his country's call in case of actual hostilities. It is his belief that one of the most effective of the civilian departments of defense in case of war would be a volunteer aviation corps with American race drivers and their mechanics as the basis.

RACING drivers already possess four most essential characteristics of the successful wartime aviator. These are: first, nerve; second, a concept of speed; third, judgment of distance, and fourth, a knowledge of engines. These things are more basicly necessary for successful aviation, particularly in time of war, than is the actual technique of the control of an airplane, for the latter can be acquired within a very short time. Experiences of the aviation departments in the European armies have shown that the actual flying can be learned in thirty days or less, but the average aviator in Europe has required at least six months to become sufficiently well acquainted with the other essentials to make him valuable in the field.

THE function of American racing drivers then, in case of America becoming actually involved in the war, would be as a nucleus of a volunteer aviation corps in which the racing drivers would serve as instructors to other volunteers in the mechanics of the airplane. It is understood that plans are now under consideration for organizing the racing drivers for this.

Can We Mobolize the Motorist

WITH the war clouds hovering over America's doors and with preparedness as one of the chief topics of thought, American motorists have begun actually to consider by what means they and their cars may be devoted most effectively to purposes of defense. The very important part in the European war that has been taken by motor cars and by volunteer motorists has shown how much worth while will be some definite plans for utilizing the vast resources of the country as embodied in the 3,000,000 motor cars and motorists and the 300 motoring organizations of the country.

IN many cities there are now under way well organized projects for placing a great number of motor cars at the service of Uncle Sam on a few hours' notice. Car owners are volunteering their services and, in several states, military censuses are being taken to determine how many men and cars would be available if they were needed by the army or navy for purposes of defense. The most work along this line has been taken in California. Over a year ago the Automobile Club of Southern California organized a military motor corps which has been accepted as an auxiliary to the state troops and with this organization as a basis, the club has launched a plan for national mobilization which it hopes will be accepted throughout the country. If all the 300 motor organizations in the United States can be made to co-operate under this plan, it is declared that it will be possible to mobilize 1,000,000 motor cars with their owners at 9 different cities within 12 hours.

IN many of the states there are no state laws which authorize making the motorist a part of the National guard or militia. In Illinois, the plans for the organization of a voluntary motor reserve have been halted for this reason. The Chicago Automobile Club started the organization of a motor reserve among its members last August, when the Mexican trouble was most acute but was asked to wait until the federal authorities could arrange definite plans for their co-operation with the state and federal troops. Now the question of what such reserves could do is even more vital.

National Defense and Roads

IN connection with the defense plans of the federal government and more particularly the use of motor cars in these plans, too much cannot be said about the part which connecting highways throughout the country would play in military mobilization purposes. It is probable, even should this country be fortunate enough not to become involved in the European struggle, that the awakening of public mind and government interest in our needs for national defense will result in a very decided extension of the improved highways throughout the country. This is more probable, even when we consider the part that motor vehicles may play in any warlike activities. For them good roads are not only desirable, but necessary.

ACCORDING to Senator Bankhead, the chairman of the Senate committee on post offices and post roads, the present federal appropriation of $85,000,000 is but a beginning in the work that the national government shortly will be doing in the matter of road construction. This money is to be expended during the next five years and with it there will be an additional $75,000,000 contributed by several states, and the senator expects to see that congress will appropriate annually from $50,000,000 to $75,000,000 for highway improvement with the main idea of its adaptability to military necessities. He predicts that this will be the partial reason for the existence in the United States within this generation of the greatest system of highways to be found anywhere in the world.

Have You Heard California's Call?

Motor Age Touring Issue Will Explain It

Last Week and the Week Before We Told You What Was Coming for Tourists—This Week We Go a Little Further and Tell Briefly Why the California Call Appeals—The Touring Number Will Go Into Detail on All Points

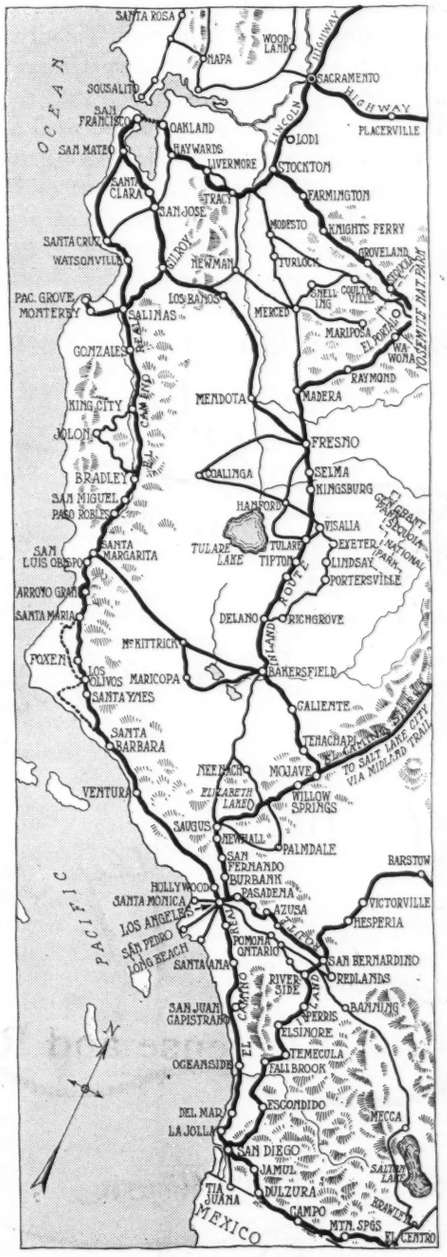
WHO has not heard the insistency of California's call? You may not have heeded, but who has not heard it—the siren voice that entreats you to come as did the sirens of old to Odysseus's sailors, when he filled their ears with wax to shut out their bidding, but the call you and I and the universe hears coming from the far-off Pacific would lure us not to destruction as the sirens of mythology did their victims, but to joys of mountain, valley, river, stream and sea. California! There's a charm in the very name. Ask a hundred persons who are keen to travel—who is there who is not keen for travel?—where they would like to go and we will wager that eighty of them will answer "California." Not because it is farthest away; not because it has more mountains than other states, but because, like nationally advertised products, our minds think of California when they think of travel.

California Big Throughout

There is no thought of belittling California; it is a great state and one of which the native sons should be and are proud. Within its confines one finds the whole gamut of temperatures, the combination of sea, valley, desert and mountain; roads that are the embodiment of the highest type of highway engineering; a hospitality in the people that knows no aloofness and an energy predominating the people that makes one admire the California spirit, once they come in contact with it.

Historically the state has much to show you. In the category of nature it equals any and excels many. Second only to Texas in area as a state, California ranks close to New England in charm of early associations, although its historic period began very late. When New England was burning witches on the green and the South was dancing the minuet and New York was founding an aristocracy out of the Dutch burghers, this vast and lovely tract, with a soil as rich as the minerals within her, was peopled by a few Indian tribes, so stupid that they rarely learned each other's language, so lethargic that they rarely fought.

To-day one drives over roads built and laid out centuries ago by the Franciscans. This main road skirts the coast from the southern end of the state north to the point immortalized by Jack London in the Valley of the Moon. And such a road as it is—El Camino Real—the Highway of the King. Kaleidoscopic changes spread before one as they drive through the Golden State, an ever-unfolding vista that pleases the eye and clings in the memory. El Camino Real is a long chain on which the Franciscan friars hung their missions almost a century and a half ago. With the conquistadores of Spain they tramped through the sand and dust and over the mountains to teach the redskin of the pale-face God and civilize the Indian. The majority of the houses of worship which they established along the road are standing as monuments to their piety and persistence. There are nineteen strung out on the 750 miles of highway from San Francisco to San Diego. The highway of the missions was a road of colonization and California's history starts at the beginning of El Camino Real.



Lower California highway map

Two Playgrounds There

Two of Uncle Sam's national playgrounds lie within the borders of California. Yosemite, than which there is none more attractive, is almost due east of San Francisco and easily accessible. Here the Master Painter has given free reign to the brush and the result can best be appreciated through the medium of the optic nerve. It is only within the last two years that motorists have been privileged to take their cars within the park, but now that our Uncle says we may, the only admonition is—see it!

Mighty giants of the forest have a penchant for the Golden State and this is best exemplified in the Sequoia National Park, where are many sequoia trees measuring more than 10 ft. in diameter. John Muir has said that "the physiognomy of these trees is almost godlike." It may help your comprehension of big trees a little to learn that a box big enough to have easily held the ill-fated Lusitania, one of the largest ships ever built, could have been made from inch boards sawed from one of these giant sequoias, with enough left over to build several houses. The largest tree in the park is known as the General Sherman and measures 36.5 ft. in diameter and is 279.9 ft. high. Again quoting Muir: "The sequoia is the first to feel the touch of rosy beams of morning and the last to bid the sun good night."

Here is an ideal place to camp, for the country is magnificent, the scenery of the best and all parts are easily accessible. The peaks of this park are among the loftiest and the canyons among the deepest and most romantic. One never tires of telling of California and no matter how much one says, he feels he had hardly begun. April 5 and California should both be marked in red on your touring calendar.

Will You Tell Us of

Worth-While Short Trips

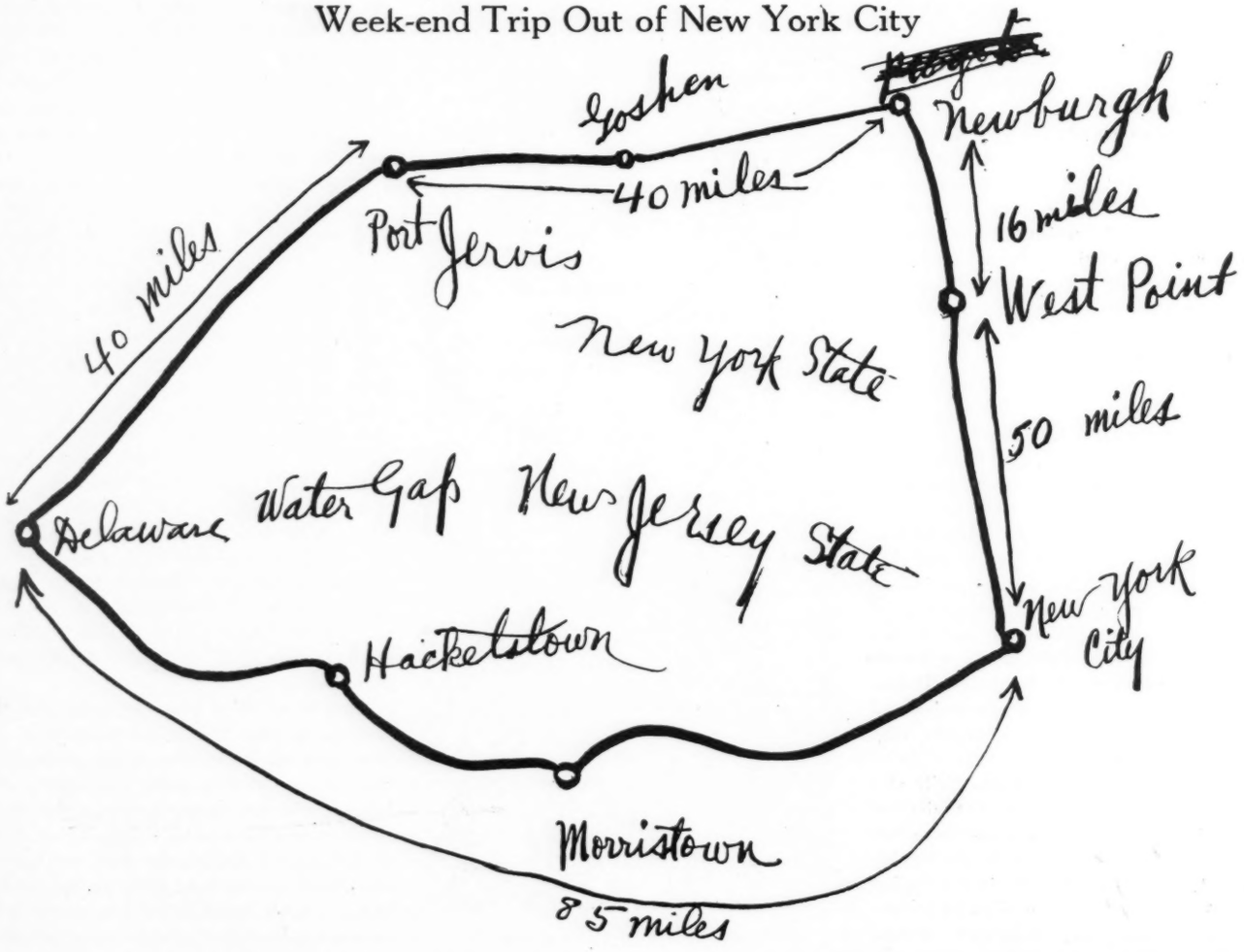
That We May

Pass Them on to Others?

YOU'VE all heard the parable of the three talents. In which category are you? Wouldn't you consider it a privilege to give your fellow motorist—you know motorists are invisibly joined in one big fraternal family—information that would help him to discover new places to go and easy ways of getting there; not only easy ways but the best ways? That is just what we are asking you to do and we are counting on your practice of the Golden Rule for the success of the plan. We have asked you to mark April 5 on your calendar in red since that is the date of the annual MOTOR AGE touring issue. We are going to give in this issue many maps in colors of various sections of the country which will show the best roads that virtually bind each town of the whole country together. Now, here is where you can do your fellow motorist a good turn and he is going to do as much for you. We want a rough map similar to those shown on these two pages, outlining the best motor trips for week-end or three or four-day trips around your home. You know your own vicinity best and we want you to tell us in your own way just what trips you would recommend to anyone who wishes to come into your vicinity. We want to know the condition of the roads, what there is to be seen enroute, and any other information such as you would give the tourist if he stopped you on the road and inquired.

This is going to be a banner touring year. The annual touring issue of MOTOR AGE is going to be designed along the line of real service. Not only will it tell you where to go, but how to get there and what you should see during the tour over any one of thousands of suggested trips.

Week-end Trip Out of New York City



What are the best motor car trips for those who would take week-end journeys of all day Sunday or perhaps Saturday afternoon and Sunday, around your home?

What are the best motor car trips around your city for such holiday periods as Decoration day, July 4, Labor day, when you would probably only be gone two or three days?

We have given you an idea of the kind of maps we would like you to send us. Also there is a suggested form of letter that covers these two trips shown on the maps. You will note that principal cities and towns are given and the distance between. Be as specific with your information as you can. Tell your story just as you would want someone else to tell you about the trips that can be taken from their home town.

Fifteen minutes—a half hour at the outside—will enable you to give us all the information we need. You know the old saw about procrastination. Won't you get this information to us at once? April 5 is not far away and in that issue we will pass back to you a hundred-fold more information about short and extended tours than we ask you to give. We know you will appreciate this information, but not one iota more than we shall appreciate your co-operation with thousands of others in its preparation.

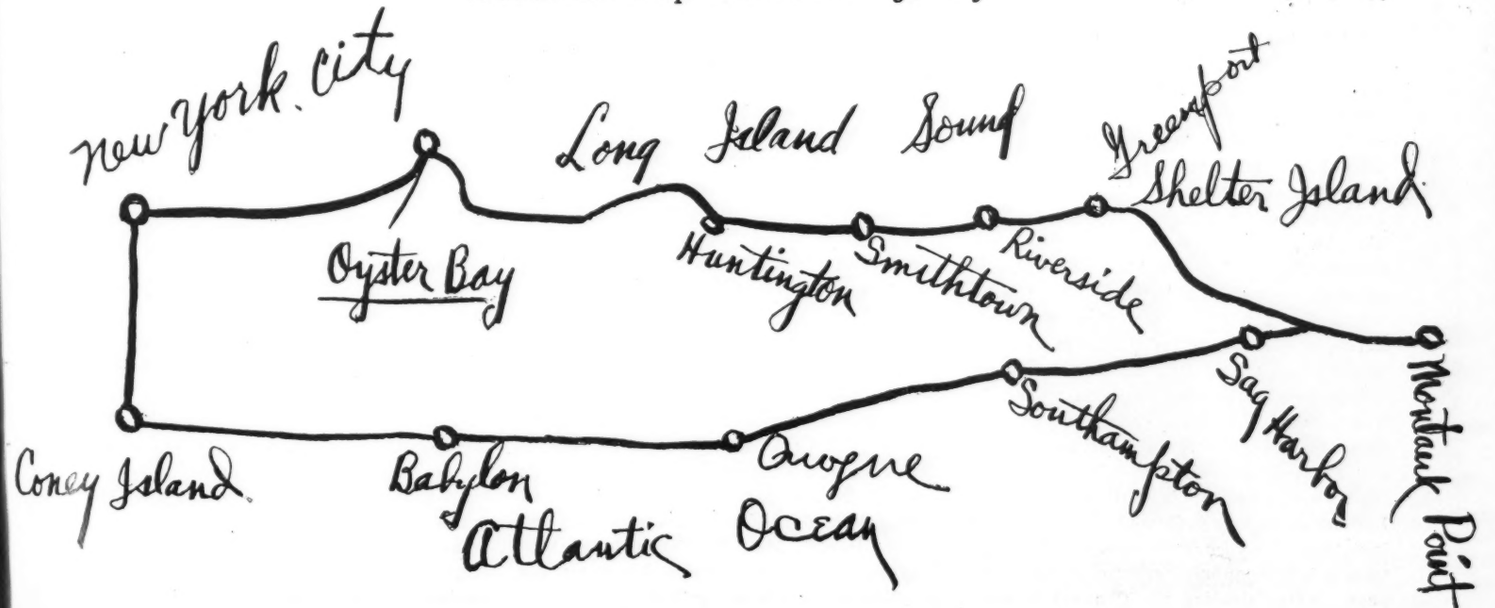
This Is How to Describe a Tour

NEW YORK, Feb. 23.—One of the nicest week-end tours around York City is to the celebrated Delaware Water Gap in Pennsylvania. You cross the Hudson river and go over fine bitumen roads to Morristown, N. J., where Washington had headquarters and where the house he occupied is still standing. You then cross Schoolie Mountain, one of the hardest climbs in all New Jersey, and go through Hackettstown to the Gap. You can leave New York at noon and are at the Gap for a 6 o'clock dinner. The following morning you have a fine ride up the Delaware river to Port Jervis and then cross over to Goshen, which is near the famous estate of the late E. H. Harriman, the great railroad builder. You then go through rolling country to Newburgh on the Hudson river. Here you turn south along the Hudson and cross Crows Nest Mountain to West Point, the great military school, on the Hudson. From West Point it is a fine 50-mile ride along the Hudson to New York City.

There is another fine week-end trip out of New York, and it is around Long Island. It takes you all Saturday afternoon and all day Sunday. You leave along the north side of the Island and pass through Oyster Bay, the home of ex-president Roosevelt. You continue along the north of the Island not far from the Motor Parkway, which was built for the exclusive use of motorists. You pay $1 to make a trip over the 50 miles of it. You travel along the north shore for 112 miles to Shelter Island, where you cross over a couple of ferries to the lower side of the Island and then go through Sag Harbor and out to the very end of the island at Montauk Point, where there is a famous lighthouse. You are over 140 miles from New York City. You return to the city along the south shore, passing through the places shown on the map. The road is good all of the way, except for 10 miles going to Montauk, where you have to go through deep sand and often get stalled and have to be drawn out with a couple of teams of horses. On your way home you pass through a score of pretty towns and finally can stop at Coney Island, which, while a little off the route, is full of interest, especially from the amusement standpoint.

There are many other week-end trips. You can go to Albany, N. Y., 150 miles up the east side of the Hudson, and come home along the west side, thus passing through the Catskill Mountains. And if you like you can go to Atlantic City on the Jersey coast, passing through a chain of resorts along the shore. You can return by Philadelphia.—H. J. Jones.

Week-end Trip Out of New Jersey



Rickenbacher Is Back from Europe

Racer Ends Search for Speed Cars with Sunbeam Prospects

CHICAGO, Feb. 23—Prospects for the addition of two, and perhaps three, six-cylinder Sunbeams to the field of racers in America for the 1917 speed season are bright, provided, of course, that this country does not become actually involved in the war. This is the message brought back by Eddie Rickenbacher, who has just returned from Europe and is now on his way to the Coast to report to William Weightman, III, the millionaire sportsman of California.

In Europe Two Months

Rickenbacher has been in Europe for the last two months to arrange for the importation of one or more of the foreign cars for Weightman's stable and at the same time was commissioned by the Indianapolis speedway management to interest such European talent as might not be needed for the military operations in bringing cars over for the 1917 speed contests on this side.

If the proper arrangement can be made, the three Sunbeams will be on hand, possibly with Christiaens in charge. If the Sunbeam driver finds it impossible to come to this country, Rickenbacher probably will be in charge of the Weightman importations.

The Swiss pilot is silent as to maximum speed figures but declares the new English cars will open American eyes. The engines will embody all the features that plants the dominating factor in English have made the Sunbeam aviation power military and naval aviation. Possibilities of 120 m.p.h. are hinted.

Had Movie Type Trip

Rickenbacher arrived in America from Liverpool on the "New York" after a series of adventures that would make an excellent plot for a movie thriller. As reported in MOTOR AGE, he was not permitted to land for several hours on arrival at Liverpool in December, as ostensibly there was something wrong with his passports. After being stripped and searched and delayed a long while he was allowed to go to a hotel for Christmas, where through the good offices of Chassagne, now in charge of Sunbeam aviation engines in Paris, and Louis Coatelen, managing director of the Sunbeam works, he was permitted to go. Though technically at liberty he soon found that he was under constant surveillance with two Scotland Yard men on his trail all the time. In London he was informed by the authorities that his appearance corresponded with that of a German spy expected on the same boat. After crossing the Channel to visit the Peugeot factory he was turned back at Bordeaux and had to return to London. At Wolverhampton, Feb. 3, he learned of the severance of diplomatic relations between America and Germany and that the only boat he could hope to get away on left Liverpool, 156 miles away, in less than 4 hrs. With Coatelen at the wheel of one of the Sunbeam racers they caught the "New York" with 2 mins. to spare.

As a fitting close to the experiences of an American race driver in Europe, it must be recorded that during the first day out, a stowaway spy was hauled out of the coal bunkers; also, that the menacing eye of a submarine was sighted.

PEERLESS PRICES HIGHER

New York, Feb. 24—The Peerless Motor Car Co., Cleveland, Ohio, will raise its prices Feb. 28. The touring car and roadster, selling at $1,890, will be $1,980; the sedan, now $2,750, will be $2,840; and the limousine will rise in price from $3,260 to $3,350. The sporting roadster and the coupe will remain at their present prices.

DEALERS DODGE EMBARGO

Kenosha, Wis., Feb. 24—Trucks are being shipped by express and driven overland from the factory of the Nash Motors Co. to fill orders already delayed by the embargo in the East. L. A. Leathers, dealer in Brookville, Pa., ordered two Quad units during the New York show, and they finally had to be shipped by express. L. G. Martin & Son, Pittsburgh dealers, are planning to use express also. Jones & Saxton, Youngstown, Ohio, have been driving from the factory, as has the Flint Auto Co., Flint, Mich.

Detroit, Feb. 24—Not a day passes but long strings of Studebakers leave the factory by the overland route for distant cities. Studebaker dealers within a radius of 400 and 500 miles of Detroit are using this method to obtain their 1917 allotment. Even cattle cars, gondolas and flat cars, for a while available for railroad shipments, have been tied up by the coal shortage and other necessities.

DAYTON GOT 9-CENT GAS

Dayton, Ohio, Feb. 26—The city of Dayton is rather fortunate in the purchase of the gasoline supply for the various departments of the city government, but not as much so as was reported in public print as coming from Clinton Rogers Woodruff, in a speech made before the Commerce club of St. Joseph, Mo. It was reported that Dayton had a contract for five years for gasoline at 9 cents per gallon.

According to H. M. Waite, city manager, the city did have a contract with the Standard Oil Co. for one year at 9 cents per gallon. That contract expired in August, 1916. During the year, however, the city of Dayton saved thousands of dollars because of the contract as gasoline sold at 23 cents for a portion of the year and at all times was considerably above the contract price.

Since the expiration of the contract the city has been buying its supply at 2 cents below the market price as it varies from time to time.

FAGEOL CORRECTS REPORTS

Chicago, Feb. 26—Reports that the Fageol car is to be manufactured in New York are called premature by President Fageol. Plans for locating the factory in the East, however, are under consideration.

RIVER TO RELIEVE CONGESTION

Kansas City, Mo., Feb. 26—Navigation of the Missouri river by the Kansas City company opens March 1 and this, it is confidently expected, will provide some relief from freight congestion. Last year there were many shipments of motor cars by boat; and many tourists, deprived of their summer outing on the ocean, took the Missouri river trip—and probably many by water elsewhere too— their machines being carried on the same boat. The largest volume of business by the boat line touching the motor industry, however, is in tires and accessories, of which several hundred thousand dollars' worth were carried last season. The boat service will doubtless aid in this distribution the coming season quite as materially.

BEN HUR TO EXPAND

Cleveland, Ohio, Feb. 23—The Ben Hur Motor Co. will hold a meeting of stockholders here in March to vote on a proposed capital stock increase. The company is now capitalized for $1,000,000 and will increase it to $6,000,000.

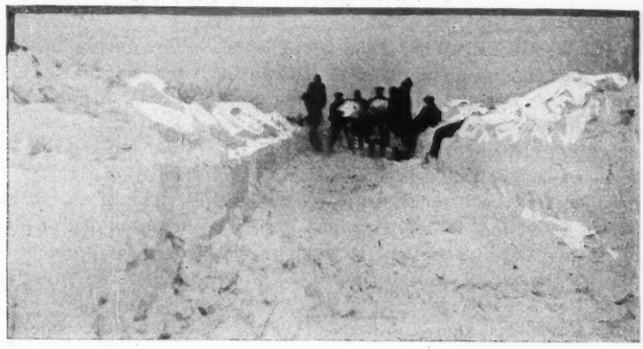
One structure, erected by the company at Willoughby, Ohio, 400 ft. by 150 ft. with 2 stories of office space and 66,000 sq. ft. of floor space, has been occupied for 20 days and is nearing general completion. A cement floor in the factory section has been delayed by the weather. If this can be laid soon the company hopes to be started within 60 days.

Between thirty and forty cars have been shipped, and plans are for from five to ten cars a week for the time being, as it is hard to get bodies. The concern has a capacity for twenty cars a day in the one structure and will erect two more buildings with 240,000 sq. ft. of floor space soon, which will increase the capacity to more than 100 cars a day. Contracts have been made for materials for 3000 cars and the company hopes to purchase a body and an engine plant to make its own bodies and engines, if the present shortage is not overcome otherwise.

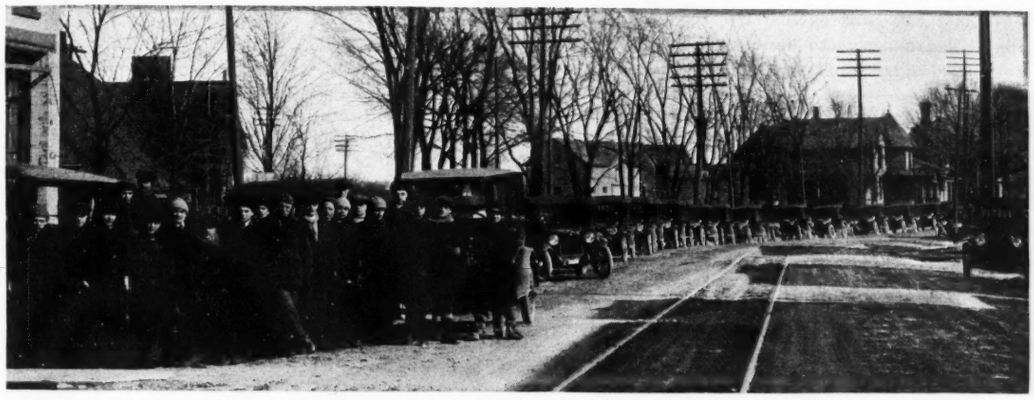
"Necessity Is the Mother of Invention"

Driving Cars from Factory to Dealer Solves Transportation Problem

Pilot car of a Dodge fleet bucking Michigan drifts that almost obscure its wheels

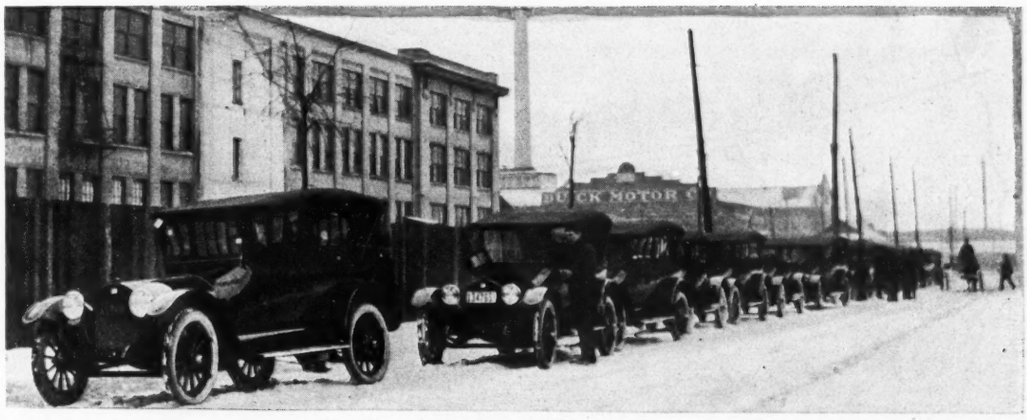


Drivers in some cases have to form spade clubs where drifts have become deep



It requires a small army of men to conduct a fleet of cars from factory to dealer. Here is the line-up of Dodge cars on the way from Detroit to distribution points in the middle west

Buick has been showing its resourcefulness in facing the car shortage for several weeks and is making drives down through Michigan, comparable only to some of the famous drives in Europe



Dealers and distributers are clamoring for Buicks, and drifted Michigan roads, though difficult, are unheeded

Frequently the Buick fleets find the drifts too deep to buck and the snow shovel is as useful and necessary as fuel

Used Car Business Plan Is Dropped

Milwaukee Dealers Temporarily Abandon Co-operative Clearing House Idea

MILWAUKEE, Wis., Feb. 26—The effort of members of the Milwaukee Automobile Dealers, Inc., to solve the problem of the used car by organizing a co-operative clearing house association in the form of a $100,000 corporation has been dropped for the present, at least, because of the disinclination of more than one-half of the potential members to support the plan by the actual subscription to the issue.

Used Car Show New

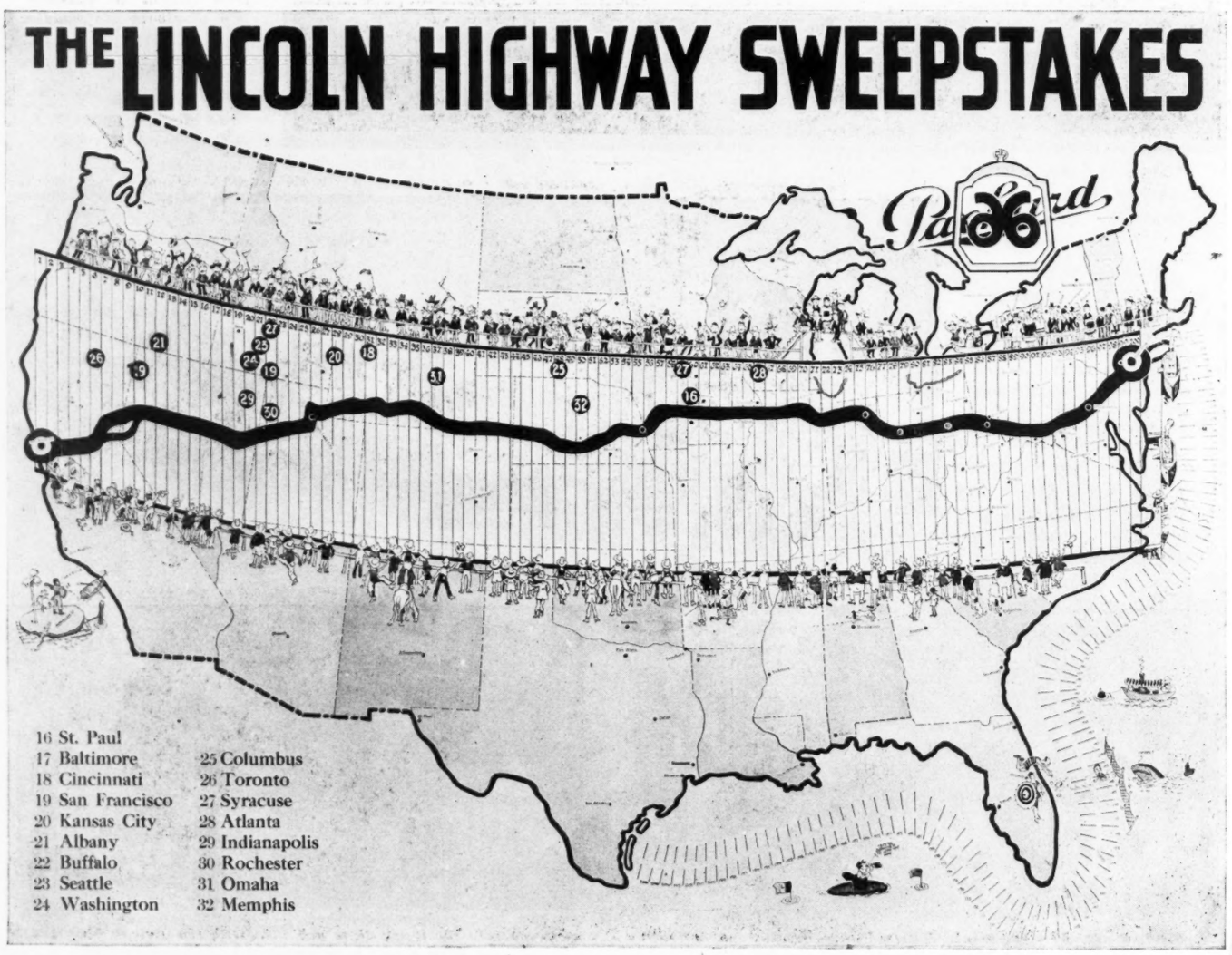
A Used Car show, probably the first event of the kind in the United States, may be the result of the movement put under way several months ago to bring the vexatious second-hand car problem at least to a partial solution. While details still are indefinite, the M. A. D. has appointed a special committee to investigate the feasibility of conducting an exposition of this character early in the spring, with the object of cleaning up the large stocks of used machines taken as part payment on new cars during the late summer, fall and winter months. This committee consists of Frank J. Edwards, KisselKar and Dodge, chairman; Jesse A. Smith, Hudson distributor, and George W. Browne, Overland and Willys-Knight.

The M. A. D. has been working quietly on a number of plans for taking care of the used-car problem of its members since last fall. The investigations of the situation in Milwaukee and other cities resulted in the final consideration of the plan to organize a separate corporation, with a capital stock of $100,000, which was to build a warehouse, service shop and display building exclusively for used cars, and which was to handle all of the second-hand machines received by the constituent members. The capital stock was to have been distributed in such a manner that the organization would be truly co-operative in every sense. The plan appeared to meet with universal approval until the time came for affixing signatures to stock subscriptions. Then it was found that only one-half of the required $100,000 could be raised. It was deemed too late in the season to continue solicitation, and at a special meeting of the association on Monday evening, it was decided to drop the matter for the time being.

If a Used Car show is held, the Auditorium probably will be leased for several days some time in the early part of April, and all of the second-hand cars held by the various members of the association placed on exhibition for sale.

Fall May See Show

Although little publicity had been given to the M. A. D.'s plan of organizing a used car clearing house association, the investigations of the committee of dealers aroused great interest in all parts of the country. It appears that the used car problem is no less perplexing in Milwaukee than in other cities. The Milwaukee idea was based on the assumption that the second-hand car business is a business in itself, and one that could be handled with profit under the right conditions. The proposed association was to have been the agent of all members, none of whom would have been required to touch a used car after the plan was in



Reproduction of map to be used in Packard selling race all over the United States

operation. Prospective customers having a used car to offer for part payment would have been referred to the clearing house, which would have appraised its value and paid a schedule price in the form of a certificate. This paper would have been honored at face value by any dealer, and the dealer would have been able to realize 100 cents on the dollar from the clearing house.

PACKARD SALES RACE FAST

Chicago, Feb. 27—Many unique features characterize the selling campaign now being conducted by the Packard Motor Car Co. Each salesmen entering the Lincoln Highway Sweepstakes race, as it is called, is known as the driver of car No. 130 or as the case may be. He then chooses a mechanician to ride with him. This man is some one connected with the organization who is to give the driver his support wherever possible. A record of the salesman's standing is kept on a large map of the United States showing the course of the Lincoln highway. For example, when a man has sold one or two cars his percentage of quota is shown on the map.

The same is true of the branch offices, whose standings are shown on the upper part of the map. There is much rivalry between these different branches and already Philadelphia has challenged Chicago and New York branches to an inside triangular contest, based on the percentage of quota. The loser is to give a dinner at Atlantic City to the heads, assistant heads and sales managers of the three companies.

Many branches are editing special bulletins to their salesmen to stimulate and encourage them. In addition, every bit of news or information pertaining to the contest is placed in the salesmen's hands and is already having its effect. In addition to the prizes which the Packard company itself is awarding, the local branches also are offering other cash prizes.

STANDARD BUYS BOCK BEARING

Cleveland, Ohio, Feb. 24—The Standard Parts Corp. of this city, the consolidation of the Perfection Spring Co. and the Standard Welding Co. of which Christian Girl is president, has purchased the Bock Bearing Co., Toledo. The purchase involves $2,000,000 of which payment was made by part cash and the balance by stock of the Standard Parts Corp. The Bock plant will remain in Toledo and W. E. Bock will remain with the company.

Owners of more than 50 per cent of the Bock Bearing Co. consented to the sale of that concern to the Standard Parts Co. at a basis of about $151.60 per share. The Bock company is capitalized at $1,200,000 common stock and $450,000 preferred.

The Bock Bearing Co. was organized by W. E. Bock in July, 1913, and manufactures a tapered roller bearing. It is planned to turn out bearings for 350,000 cars in the plant this year, and production will be increased from 2000 to 10,000 a day.

Are We Ready for War, He Asks

Speaker at Philadelphia Compares American and European Invention Fostership

PHILADELPHIA, Pa., Feb. 21—"The Automotive in War," the subject of Joseph A. Steinmetz's talk at to-night's meeting of the Pennsylvania section of the S. A. E., proved not only pertinent but convincing as regards the lack of co-operation between the government and the citizen in the invention of instruments for defense or offense in war.

Mr. Steinmetz, who is the designer of the Janney, Steinmetz Co., this city, has collected a most complete set of illustrations showing the fighting machines produced by the ingenuity of Europe. He advocates that the engineers of the United States get together in groups to discuss preparedness, that is, the design of trucks, etc., for use in war. He compared the European method of fostering invention and ideas by financial help with that of the United States Government wherein each individual must see his own ideas and inventions through by his own finances.

Civilians Design Armored Cars

Europe has about 100,000 armored cars, many of which were designed by civilians. Ideas have been worked out successfully by the European governments. For instance, one of the belligerent countries is now working on an aeroplane with invisible planes, the material in the planes being a special preparation containing the strength and rigidity of the canvas now in use and being transparent. Another suggestion, and by the way, by an American, is floats on the German dirigibles for use on the water.

Mr. Steinmetz deplored the present apathy on the part of the American toward preparedness. The United States has an organized army of 236,000, with a total of 20,538,347 available. More enlistments should be made and more thought should be given in regard to what would really happen should war be declared, according to Mr. Steinmetz.

Is our ambulance corps ready? Have we enough of these for actual warfare? Our armored trucks, what of them? How do our few compare with Europe's 100,000? Our aeroplanes, have they the proper protection from gunfire? Can they go on long reconnoitering trips, and are they fitted with the right guns? These are some of his questions.

An idea of what the engineers in Europe have accomplished was shown on the lantern slides during the talk. All ambulances and motor driven vehicles have wire wheels to minimize the damage to spokes during shell fire. The armored trucks and tanks have been successful through their complete armor protection, and the aeroplanes have played a prominent part. The English practically has solved the dirigible menace in London by aerial trawlers, or bombs, hanging from aeroplanes. When a dirigible is sighted the trawler is let out on a long wire and the aeroplane swoops down on the dirigible so the trawler hits the dirigible and explodes, thus destroying the dirigible.

TO FINANCE TIME PAYMENTS

New York, Feb. 24—The financing of the purchase of commercial vehicles and passenger cars upon the time-payment plan is included in the scope of the Commonwealth Finance Corp., incorporated under the laws of South Dakota with a capital of $10,000,000, 7 per cent cumulative preferred and $7,500,000 common. The fiscal agent is Sargent & Co., Minneapolis, Minn. An office will be opened in this city.

According to the plans of the company, it will purchase from responsible dealers deferred-payment paper on sold cars. Such paper, carrying the endorsement of the dealers, together with that of the company, readily can be resold at a profit.

Purchasers of cars also will be financed, the security being a mortgage upon the car itself or a contract whereby the title to the car remains in the name of the Commonwealth corporation until the last payment is made, together with an insurance policy covering fire and theft. The margin of security will be ample, as the company purposes to accept deals only on terms where the amount outstanding on deferred payments is fully covered by the forced-sale value of the car.

CASE PLOW NOT TRACTOR MAKER

The tractor operating a threshing outfit as illustrated on page 6, issue of Feb. 22, is the Wallis tractor made by the Wallis Tractor Co., Racine Jct., Wis. The J. I. Case Plow Works is the selling agent for the tractor, not the manufacturer of it.

GOODYEAR CORDS AT SHOW

In making a census of the number of cars equipped with Goodyear cords, at the Chicago show, the number was given as five. This did not include the electrics so equipped of which there were three, and as two or three of the exhibits were not complete at the time the census was taken, information was taken from those in charge of exhibits as to what was coming. This did not tally with what was actually shown, hence the showing as reported for the Goodyear cords was not in accordance with the real facts. There were Goodyear cords shown on eleven makes of cars, which was a material increase over the preceding exhibition.

LAUNCHES IOWA BUYING

Des Moines Show Demonstrates Possibilities in Territory

Agriculture Creates Demand

DES MOINES, Iowa. Feb. 24—Iowa's greatest year for the buying of motor cars was off with a flying start at the eighth annual Des Moines show, which closed to-day. Sixty-five cars, including three electrics, were shown, and there were nine accessory exhibits. The first annual Des Moines motor truck show, held at the same time, helped to draw dealers from every county of the state and swell the attendance to an estimated 40,000 as compared with 32,000 in 1916.

Unparalleled Prosperity Basis

Iowa bought 52,941 cars in 1916. At an average price of $800 per car, which is considered a fair average for a state of prosperous farm buyers, the state's 1916 bill for new cars was $41,600,000. Iowa will buy 25 per cent more cars this year than last, according to the dealers and bankers. This will mean a total of 66,176 cars to be bought in the state during the year. Dealers and bankers say that the estimated number will not even supply the farmers of the state who are prospects.

Unparalleled prosperity in Iowa is the basis of the estimates for 1917 business. The Des Moines situation is shown by the increase in bank clearings from $281,949,456.94 for 1915 to $332,604,545.86 for 1916 and a proportionately greater increase already registered for 1917 as compared with the first part of 1916.

Agriculture is the basis of Des Moines and Iowa prosperity, and Iowa corn is the yellow gold that buys the motor cars. At prevailing prices a 20-acre field of corn—and that is a mighty small field in Iowa—producing 50 bu. to the acre, will buy one copy of the most numerous car in America with enough money left over for a starter and other fixings.

Iowa Has the Price

Iowa has the money to pay for the 66,000 cars she is scheduled to buy this year. The amount is only a small part of the wealth derived from the crops of last year. The Iowa Weather and Crop Service gives $597,165,673 as the total value of Iowa farm crops in 1916 as compared with $414,379,000 in 1915. If the state could buy 53,000 cars on the strength of the 1915 crop, is an increase of 25 per cent enough to be expected in face of a $200,000,000 increase in the value of farm crops?

Iowa led all states last year in the production of corn and oats and in the number and value of horses, hogs and combined livestock. The yield of corn for the year was 366,825,000 bu., valued at $293,460,000, as compared with a yield in 1915 of 298,500,000 bu., valued at $152,235,000. The increase in value of the corn crop alone, $141,000,000, would be enough to buy 150,000 cars at $800.

Price Offset Wheat Decrease

With a decrease of 8,000,000 bu. in the wheat yield the farmers still received as much for their 1916 crops as for their crop of 1915. The oat crop brought $26,000,000 more in 1916 than in 1915, with a total yield of 186,000,000 bu.

Iowa ranks second in the United States in the production of hay, in the number and value of beef cattle, in the value of farm buildings and farm property and in the area of improved land. The state ranks third in the number and value of dairy cattle and of poultry.

Adding the value of dairy and poultry products to the value of field crops the total income of the farmers of the state for 1916 was $75,000,000. The Iowa farmer never enjoyed a more prosperous year than 1916. Never before did the value of his field crops pass the half billion mark. His daily revenue was more than $1,500,000.

Two elements entered into the making of a great year for the state in 1916. The first was the spirit of the Iowa farmer to strive for greater yields per acre each year. The second was the increase in prices. While his production was increasing the prices were advancing. The price per bushel of corn in Iowa on Dec. 1, 1916, is given by the United States Department of Agriculture as 80 cents compared with 51 cents a year before. The wheat of Iowa farmers advanced in price from 87 cents to $1.56 in the same time; his rye from 80 cents to $1.15; his flaxseed from $1.50 to $2.15; his oats from 32 to 48 cents; his buckwheat from 80 cents to $1.25; his hay from $8.70 to $9; his potatoes from 54 cents to $1.55; his barley from 49 cents to 91 cents; and his sweet potatoes from $1.08 to $1.92.

Stock Increased During Year

The same is true of livestock in Iowa. Milk cattle increased 14,000 in number for the year, and their value increased $1.50 a head, while the number of beef cattle increased 54,000 in number and 80 cents a head in value. The number of sheep increased 25,000; their value 70 cents a head. The number of hogs increased 1,349,000 during the year.

Thus we see that Iowans have the necessary money to buy 66,000 cars this year. Who will do the buying? With 198,000 cars in the state there is one car to every two and one-half families in the state as compared with one to every seven families for the nation. Is the state of Iowa near the limit of its capacity? Dealers and most bankers say no. Dealers, especially those who do business in the smaller cities and towns, report countless good prospects among farmers, retired farmers and merchants. Many Des Moines distributors say they are doing practically all their business in the country and the small towns and that there is no apparent diminution in the number of prospects. Those dealers who sell to the city trade are fully as optimistic. The reason is that there is no car-buying class. Prospective owners can be counted through the entire social scale. A Des Moines banker says his favorite waiter drives a car—and in spite of the Iowa anti-tipping law. A Des Moines dealer goes him one better and says he knows several waiters who are owners. A large percentage of the mechanical employes on one of the local daily newspapers are car owners.

Demand for New Cars

Moreover, it is pointed out that many of the older Iowa cars are going into the discard and that there is a big and constant demand for new cars to take the places of those which were new in the years gone by. This process of replacement is in constant progress and the replacements will grow in number with the passing years. The following table shows the wonderful motor car growth of Iowa since 1910:

Year	Number	Year's Increase
1911	27,988	.....
1912	44,188	16,190
1913	70,068	25,880
1914	106,087	36,019
1915	145,109	39,022
1916	198,050	52,941

In the face of such steady growth the estimate of 66,000 cars for 1917 seems moderate. It seems more so when one looks at the Des Moines show crowds and sees the hundreds of farmers coming to Des Moines from all parts of the state to get an

SHAKEN BY BLAST

Toledo, Ohio, Feb. 24 — Thirteen men were injured by an explosion of gas in the Willys-Overland plant yesterday. There was a damage of $25,000 caused by the explosion, which resulted from an accumulation of gas in an enameling oven.

early look at the 1917 models. Their pockets are literally bulging with money as a result of last year's crops, and a greater percentage of medium and high-priced cars will be sold in the state this year as a result.

Iowa has no war brides in the shape of munition factories, but the war time prices for farm products have had the same effect and the farmers of the state have made so much money that they are in the market for thousands of cars. The motor car seems to be the one great Iowa luxury. The car has entered greatly into the life of Iowa, both in the city and the country, but especially in the latter. It has come to be the greatest influence in the state to better the conditions of farm life. The farm is isolated no longer. The distance to town has been annihilated. The farmers and their wives can now go to town for the band concert almost any night, and neighborly visits are easy. It is believed the effect will be to increase the farm population in Iowa and bring about an end to the emigration of Iowa farmers to other states and keep a larger number of Iowa farmers on their farms.

SAVANNAH GASOLINE SOARS

Savannah, Ga., Feb. 23—The price of gasoline in Savannah has advanced from 22 cents wholesale to 23 cents, and the retail price has gone to 26 cents.

This is the highest gasoline has been in Savannah, and dealers predict that it will not stop here. Various causes for the rise in price are given, among them being the shortage in cars and tonnage, the tremendous amount being shipped abroad to the Allied armies, the drying up of several important wells in the West and the consequent falling off in production of crude oil.

Last spring and summer the price of gasoline soared to 22 and 23 cents, though several dealers in the city continued to sell it to the retail trade at wholesale price, making no profit. At that Savannah had a much cheaper gasoline than other cities, due, it is said, to this being a distributing point for the entire state, the Standard Oil tankers coming here direct from the Texas and Louisiana oil fields. While gasoline was selling at 19 cents in Savannah, St. Louis, Chicago and other cities were paying 26 to 27 cents. Following the rise in price a Federal gasoline probe came and the price dropped a cent or two at the time. Now it has commenced to rise again.

ORGANIZES TRACTOR COMPANY

Tampa, Fla., Feb. 24—R. E. Olds, president of the Reo Motor Co., Lansing, Mich., will organize a $1,000,000 corporation to manufacture farm tractors on a site between Tampa and Oldsmar, the new city which Mr. Olds is creating at the head of Tampa Bay. The plant will employ 500 men at the start and will build for southern trade in particular.

St. Louis Now in Circuit

Fourth City Displays 340 Cars at Its Earlier Exhibition

ST. LOUIS, Mo., Feb. 24—Though this is the tenth annual show for St. Louis, it is the first one that has been held as a part of the show circuit. Former shows have been held in the fall during the Veiled Prophet week.

The exhibition is a large one. There are sixty-one car exhibits, fifty-six accessory exhibits and thirty-five truck exhibits. Three hundred and forty cars were shown. Seventy-seven were closed cars, ninety-five touring, sixty roadsters, twenty-three chassis, thirteen electric and seventy-two trucks.

15,000 at First Night

More than 15,000 attended the first night. But that was "wishers" night, and passes were in the majority among the tickets taken in. Each exhibit space drew fifty passes for the opening night, 12,000 in all being given. For the rest of the week there were no passes. Admission was by 50 cents or a special pass from the manager only.

The decorations were simple and served to hide the commercial appearance of the building, which is the new Overland building, six-story, with 132,500 sq. ft. of floor space and every floor in use for exhibits. The columns, door casings and side walls were covered with smilax.

More than 1200 dealers from thirteen different states registered Tuesday at the manager's office. St. Louis shows also are merchandising shows, and for this reason the dealers were very active during the week.

There was much interest in the police exhibit. The show committee realized that most of the traffic trouble was the result of misunderstanding, and they invited the Safety First squad of the police department to give a traffic exhibit.

Photographs, postcards, diagrams and literature helped the traffic officers explain the points of St. Louis traffic. It was common ground. Drivers from the country and drivers from the city wanted to know, and the officers were there to tell them.

The show is given under the auspices of the St. Louis Automobile Manufacturers and Dealers Association, of which F. W. A. Vesper, Vesper-Buick Automobile Co., is president. The committee consists of Joseph A. Schlecht, chairman; H. W. Spalding, vice-chairman; and James D. Cathey, W. L. Johnson and W. S. Roberts.

70,000 AT ST. LOUIS SHOW

St. Louis, Mo., Feb. 26—The turnstile count at the show last week and the dealers' entrance showed an attendance of more than 70,000 persons. Employes were admitted through another door and are not included this count. So were daily newspaper reporters and others who held season tickets. The registration of dealers shows that 6500 came here from twelve states—Missouri, Kansas, Oklahoma, Illinois, Indiana, Kentucky, Tennessee, Texas, Arkansas, Louisiana, Mississippi and Alabama. General manager Robert E. Lee said that 8000 persons w re in the building when the curtain was rung down.

GUARANTY BANK ESTABLISHED

Chicago, Feb. 24—The Guaranty Securities Corp., New York, has made arrangements whereby the Guaranty Banking Corp. will act as its middle-western correspondent after March 1. This means that the Guaranty Banking Corp. wil operate the plan of financing pleasure car and truck dealers' time payment sales and purchases in the Middle West and Rocky Mountain states. The concern will be located in Chicago. It has been incorporated as a state bank and is expected to do a regular banking business also. The officers of the Guaranty Banking Corp. are: President, E. S. Maddock; vice-president, Paul Fitzpatrick and Howard L. Wynegar; cashier, Joseph M. Eberhardt; assistant cashier, L. Stanley Coyle; and auditor, Fred A. Franklin.

RECEIVER DOES DOUBLE DUTY

Alliance, Ohio, Feb. 26—Attorney H. C. Koehler has been appointed receiver for the Alliance Rubber Co., and the Alliance Tire and Rubber Co. The appointment was made by Judge Day. A bond was fixed at $5,000 which was furnished by Attorney Koehler and approved by the court. A selection of appraisers has not been made and no estimate of assets and liabilities made, but this will be forthcoming within a few days.

The work of the receiver will be a task as there are two distinct companies, and yet one. The first company was organized in March, 1913, with a capital of $58,000. This was the Alliance Rubber Co. In 1916, through the efforts of some of the members of the company a re-incorporation under the laws of Delaware was effected and the capital increased to $2,500,000, and the name changed to that of the Alliance Tire and Rubber Co. There is a merger of the first company, into the second company in a certain sense, but the old company affairs were never closed up and hence it is, in a way, existing to-day and the receiver must take cognizance of this fact.

Newly Drawn Bill

REGULATES STATE TRAFFIC

Proposed Texas Law Covers the Motor Case Thoroughly

EDITOR'S NOTE—At the time Motor Age inaugurated its traffic campaign it was suggested that many of the fundamental phases of traffic regulation well might be made state instead of municipal laws and this would be a big step toward uniformity of regulations within states, at least. Texas will have, if the bill before the present legislature passes, what appears to be a most comprehensive state traffic regulation; one that leaves little for municipalities to do in the way of governing the movement of traffic except to enforce the state law. Of course, there are certain individual problems that always will be for local solution, but Texas is to be commended for the initiative shown in its present movement for better and more sane traffic rules that will be uniform throughout the state.

AUSTIN, Tex., Feb. 26—R. L. Carlock of Fort Worth is the author of a bill covering practically the entire motor regulation situation, which he has introduced in the State Legislature. This measure has been favorably reported by the House committee on State Affairs and its final passage by both branches of the law-making body is said to be practically assured. The bill as it was drawn meets the views of the motor vehicle owners, the municipal and state authorities and the general public, it is claimed.

Would Index Registration

The Carlock bill provides that all applications for the registering of motor vehicles, accompanied by the fee required by law, shall be sent to the state highway department and that these registrations shall be properly indexed with the name, residence and business address of the owner. On or before Feb. 1 of each succeeding year after August, 1917, the department shall supply each county clerk and chief of police with a list of all vehicles registered from their respective counties and towns. The license number plate of each vehicle shall be displayed upon the front and back of the vehicle.

Upon each vehicle there shall also be conspicuously displayed on the front end the seal assigned to it by the highway department. Each vehicle shall be equipped with a bell, gong, horn, whistle or other device and these shall be sounded to the rider or drivers of other vehicles and persons leaving or entering street or interurban cars. At night two lighted lamps whose lights must be visible at least 500 ft. in front, shall be carried, and at the rear a lighted lamp exhibiting a red light, visible for a distance of 500 ft. to the rear is required. A lamp must also be carried at the left side. The number plate carried in the rear must be illuminated by a white light so it can be seen for not less than a distance of 50 ft. The permanent dimming of front lights is required. Each vehicle must be provided with adequate brakes, kept in good working order.

The muffler cut-out is prohibited within the limits of any incorporated city or town or on any public highway where the territory contingent thereto is closely built up.

No one who is intoxicated shall drive one of these vehicles and no one is allowed to drive without the consent of the owner.

All chauffeurs must be licensed.

When the car is standing, the brake must be on.

The passing of motor vehicles is strictly regulated. Before crossing a railroad or interurban line at grade, every motor car must come to a full stop within 15 ft. of the track unless there is a flagman or guard at the crossing to show the way is clear. When a person is struck by a motor vehicle the driver and all persons in it must stop and give assistance to the one so injured. Any violation of this section is punishable by imprisonment in the state penitentiary not to exceed five years or in the county jail not exceeding one year or by fine not exceeding $5,000, or by both such fine and imprisonment.

All speeding is prohibited on the public highways. No vehicle shall be driven at a rate of speed in excess of 30 miles an hour in the open country and not exceeding 18 miles an hour where the country is closely built up and not exceeding 15 miles an hour in any town or incorporated city, nor greater than 6 miles an hour where the traffic is dense or crossing intersecting streets or approaching a bridge, dam, trestle, causeway, viaduct or in going around corners.

Term Vehicle Is Broad

One of the important features of the bill is that which provides a complete set of traffic regulations for the purpose of that particular section and its subdivisions. The term vehicle is made to include every draft or riding animal whether ridden or led with the exception that an animal or animals attached to any conveyance shall constitute a vehicle. The provisions regulating traffic are as follows:

"Vehicles proceeding in opposite directions shall pass each other to the right, each giving to the other one-half of the road as nearly as possible.

"Vehicles overtaking other vehicles proceeding in the same direction, shall pass to the left thereof and shall not again drive to the right until the road is reasonably clear of such overtaken vehicle.

"It shall be the duty of the driver, rider, or operator of a vehicle about to be overtaken and passed to give way to the right in favor of the overtaking vehicle on suitable and audible signal, given by or on behalf of the operator, driver or other person in charge and control of such overtaking vehicle, if such overtaking vehicle be a motor vehicle.

"Excepting where controlled by such traffic ordinances or regulations enacted by local authorities, as are permitted under this act, the operator of a vehicle approaching an intersection on the public highway shall yield the right-of-way to a vehicle approaching such intersection from the right of such first named vehicle.

In Regard to Signals

"It shall be the duty of the person operating or in charge of an overtaking vehicle to sound audible and suitable signal before passing a vehicle proceeding in the same direction.

"All vehicles approaching an intersection of the public highway with the intention of turning thereat, shall, in turning to the right, keep to the right of the center of such intersection and in turning to the left shall run beyond the center of such intersection, passing to the right before turning such vehicle to the left.

"In passing and overtaking, such assistance shall be given by the occupants of each vehicle respectively to the other as the circumstances shall reasonably demand in order to obtain clearance and avoid accident.

Precaution Is Made Obligation

"Every person having control or charge of any motor vehicle or other vehicle upon any public highway and approaching any vehicle drawn by horse or horses, or any horse upon which any person is riding, shall operate, manage and control such motor vehicle or other vehicle in such manner as to exercise every reasonable precaution to prevent the frightening of any such horse or horses and to insure the safety of any person riding or driving the same; and if such horse or horses appear frightened, the person in control of such motor vehicle or other vehicle, shall reduce its speed, and if requested by signal of the hand, or otherwise by the driver or rider of such horse or horses, shall not proceed

farther toward such animal or animals unless such movement be necessary to avoid injury or accident, until such animal or animals shall be under the control of the rider or driver thereof.

"The person in control of any vehicle moving slowly along upon any public highway shall keep such vehicle as closely as possible to the right hand boundary of the highway, allowing more swiftly moving vehicles reasonably free passage to the left.

"The person in charge of any vehicle in or upon any public highway, before turning, stopping or changing the course of such vehicle, shall see first that there is sufficient space for such movement to be made in safety, and if the movement or operation of other vehicles may reasonably be affected by such turning, stopping or changing of course, shall give plainly visible or audible signal to the person operating, driving or in charge of such vehicle of his intentions so to turn, stop or change said course.

"In passing any railroad, interurban or street car while passengers are alighting from or boarding the same, vehicles shall be operated with due care and caution so that the safety of such passengers shall be protected and for that purpose said vehicle shall be brought to a full stop, if reasonably necessary to obtain the object of this subdivision.

To Limit Coasting

"Every motor vehicle, when moving along such portions of the road where the curvature of the road or highway prevents a clear view for a distance ahead of 100 yards, shall be held under control and not permitted to coast, and the operator thereof in approaching curves or sharp turns in the road shall give a warning by his gong or other adequate signaling device.

"Police patrols, police ambulances, fire patrols, fire engines and fire apparatus in all cases while being operated as such, shall have the right-of-way with due regard to the safety of the public; provided that this provision shall not protect the driver or operator of any such vehicle of his employer or principal from the consequences of the arbitrary exercise of this right to the injury of another."

Local Powers Given

Besides the rates of speed that are fixed by the bill, the local authorities of cities and towns are also empowered to pass ordinances governing same. The bill further provides that upon the arrest of any person three times within 60 days for speeding or running a car when intoxicated he shall be prohibited from further operating a motor vehicle for a period of six months.

INTER-STATE CONTROLS BEAVER

Muncie, Ind., Feb. 26—The Inter-State Motor Co. has taken complete control of the Beaver motor and will manufacture 10,000 cars this year. The 1917 production will represent an increase of 230 per cent over last year's output.

Canada May Have Cross-Country Road

Unemployment After War Is Used as Argument in Favor of Highway

VICTORIA, B. C., Feb. 23—At a recent meeting of the board of governors of the Island Automobile Association, held here, it was decided that the time had arrived vigorously to advocate the linking together of a continuous road across Canada from the Atlantic to the Pacific, to be known as the Canadian highway.

The plan of the Island Automobile Association is not to form an inter-provincial association to secure the required results, but simply to make a direct appeal to the various good roads and motor clubs, boards of trade, rotary clubs, farmers' institutes, trades and labor organizations, municipal councils, and provincial governments across Canada to do what they can to connect together the Canadian highway in their own province and locality, and also for these various bodies to urge upon the Federal Government the desirability of federal aid to the project.

Public Work Needed

The feeling that there may be considerable unemployment after the war and that it may be necessary to arrange for some public works to provide employment, is shared by some of Canada's leading statemen. Hon. W. T. White, minister of finance, stated at Toronto some months ago: "After the war there will be a period of dislocation which the Government would bridge over by pressing vigorously public works." Similar utterances have been made by other public men. It is planned that this project will not conflict in any way with any good roads movements now in progress but rather to link it up with projects already in existence so that indirectly this whole plan can be carried out.

It has been suggested by the Island Association that it would be willing to support federal aid, provided in any of the following ways:

Proposed Federal Aids

1—The Federal Government to take certain difficult or isolated sections of the Canadian highway route, irrespective entirely of provincial boundaries, and construct the roads in those sections, and, upon completion, give these sections to the province where the work was done.

2—The Federal Government to undertake the entire work across Canada and its future maintenance and ownership. The various provincial and municipal authorities to turn over to the Dominion Government, free of charge, any existing roads that may be on the Canadian highway route.

3—The Federal Government to supply a lump sum of money for expending upon the Canadian highway, to be given to and divided among the provinces in any of the following ways:

a—In proportion to the amount already expended by each Provincial Government on the Canadian highway.

b—In proportion to the difficulty and distance in each province of the unfinished portions of the Canadian highway.

c—In proportion to the customs duties collected on cars and car supplies in each province, 1905 to 1914 inclusive.

d—In proportion to the average amount spent by each Provincial Government, 1905 to 1914 inclusive, on all their roads.

GOODYEAR DEVELOPING COTTON

Chandler, Ariz., Feb. 24—The Goodyear Rubber Co., which purchased 8000 acres of raw desert land near here several months ago for a cotton plantation to produce the raw material that enters into the fabric of the tires they are making,etaoinshrd ll of the tires they make, has made a wonderful transformation in the vast stretch of unsightly waste land. It is operating here under the name of the Southwestern Cotton Co. The clearing of the land of brush was begun about six weeks ago and the entire 8000 acres are now ready for planting. Power tractors are pulling the gang plows, which break the land to a depth of several inches. The tract is divided into four units of 2000 acres each. To provide water for irrigating the crop, twenty-seven wells have been sunk, each to a depth of about 40 ft.

WILL MAKE HANSON FLIER

Detroit, Feb. 24—G. W. Hanson of the Hanson Motor Co., Atlanta, Ga., the company which will manufacture the Hanson Flier, is now in Detroit working with Don Ferguson, consulting engineer of the company, who is completing the first model at the Puritan Machine Company plant.

TECHNICAL PUBLISHERS MERGE

New York, Feb. 27—Special telegram—Two of New York's large technical and engineering publishing companies have merged under the name of the McGraw-Hill Publishing Co. Under this title are included what was the McGraw Publishing Co. and the Hill Publishing Co. The McGraw Co. published the Electrical World, Engineering Record, Electrical Railway Journal, Electrical Merchandising, Metallurgical and Chemical Engineering and Contractor. The Hill company published American Machinist, Power, Engineering News, Engineering Mining World and Coal Age.

"Carne," meat for the price of a bullet and a steady hand

Through the Wild and Untamed Land of Manana

Perilous Trip Over Barren Country Between Gila, Ariz., and Bay San Georges in Mexico Made by American Explorers

"PASSPORTS? Rats!" Thus did Doc rid me of my last objection to venturing into wild, untamed Mexico, and thus did he clinch my decision to be with him on the trip that resulted in a distinct victory for the preseverance of man and the good qualities of a motor car. Now, he has the honor of being the first man to motor to the Gulf of California from the Arizona side.

"Here is my passport," he continued, pointing to a converted Springfield rifle, beautifully balanced, and sighted for either hunting or the target range. And, as it turned out, even that passport, was not needed, for, while most of Mexico is unsafe, El Distrito de Altar is even without knowledge of revolutions, murder and rapine.

Seeking unusual game, one must take unfrequented paths. And that is why our port of entry into the republic was not a popular one.

Way down in southeastern Arizona are many famous mining towns, and now, a new and yet-to-be famous mining town is growing up to the west of the great copper belt. It is Ajo, the place with the short, Mexican name for garlic and the long American name for cash—a city in the making, with mountains of copper all over the landscape as its excuse for being. The development of Ajo had been followed by that of a motor road from the Southern Pacific main line at Gila, thus extending civilization about 40 miles farther into the misnamed desert.

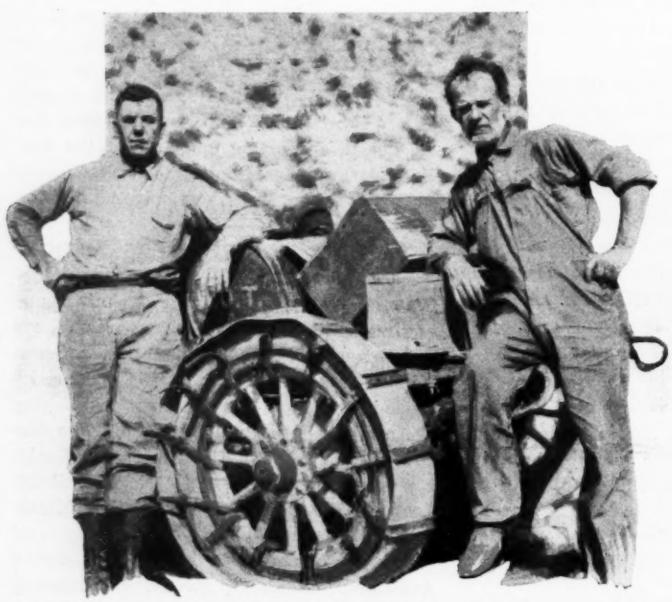
There was much to attract a man to that region. There was solitude; the hunting was said to be good for the Papago Indians lived by it; the keen lure of gold was all over that land. And, then, there was the desire to be first in a place where man had never penetrated in any large quantities.

Nobody would have very much trouble getting to Ajo, provided the Gila River did not overindulge in spring floods. Arizona is a dry state, but its erratic streams seem to find bootlegging clouds high up in the mountains, and they go on tears that result in cut communications and much swearing on the part of motorists. But we had our car on the far side of the Gila, and it was a simple matter to hop on a train and creep along with it over the temporarily repaired bridge, and to reach Gila not more than the usual number of hours late.

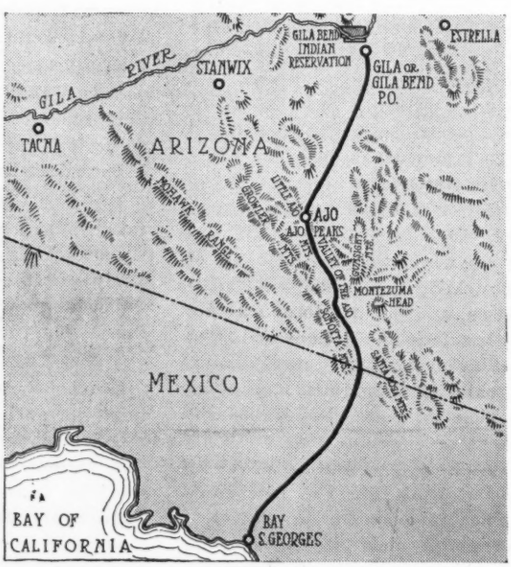
Into the Desert Section

There, we were freed from dependence on railroad schedules. A quick run to Ajo, the raw. Rain that had delayed us now made our road smooth and hard packed, dustless, and the car was shoved along at a tolerable speed. Lunch at the glaringly new Japanese restaurant, an adobe-housed joint with "Tea Garden Cafe" nervily stuck up in front of it, delayed us but half an hour, for we were eager to see what the virgin desert looked like, and how a motor car would fare in it.

The way had to be of our own making. Nobody but burro-punching Indians and



The sand treads. On the right, Dr. Boido, the inventor, and on the left, Bill Tremaine, ex-racing driver



Map showing route taken in driving from Gila to Bay San Georges in the north end of the Bay of California

a few prospectors had ever gone that way before. The desert was spread out under a 9,000,000 horsepower sun. It was a no-man's land. It's 40 miles to a fence, either way. Driving over it, you lose count of miles, track of distance and almost desire to know where you are. Huge patches of cotton-colored chollas, forests of saguaros, valleys chock full of dreaded prickly pears, slopes dotted with bisnaga, hilltops crowned with whorls and whorls of spiky ocotillo, like a Sioux head-dress—these are some of the varieties of stickery plants you find there. In English, one calls them all cactus, but the Mexican has a name for every vicious one of them.

Way Is Uncharted

Meager information from prospectors and Indians and still more meager literature regarding the region agreed as to one thing: There was a killing scarcity of water in that region of sandy flats and granite or lava hills. "Tinajas" or tanks in the rocks might be depended on for drink for man and motor provided the sun hadn't got there first, and there was one driven well near the Papago mountain. It had been sunk 400 feet to good water and left in the midst of its rusted and dismantled boilers and engines, when a mining company blew up 15 years before. So, it was strictly up to the motor car. No man could drink unless he could cover large distances between the tinajas. Even at the well, he had to have a car or a team of horses to yank the ten foot long galvanized iron bucket those 400 feet, by means of a tripod and pulley. And the motor car justified faith in it. Not only was it a means of travel, but an instrument for slowly and clumsily heaving water out of the depths of the earth.

Sixty miles due southwest of Papago well lay the head of San Georges bay. That was a goal that two trips had failed to reach, but we meant this one to be successful. We had a stout little stripped car, capable to doing 14 miles to the gallon of gas. Moreover, this car seldom confided any troubles to man. If it felt bad, it kept the fact to itself. It's odd that I should speak of a motor car this way, but after you've explored terrific wastes, with nothing but a car for company, you begin counting it one of the bunch.

Nature probably intended that a car should traverse her seemingly most forbidding wilderness. Soil that clung affectionately to the wheels the first time it met them, was packed down enough after a few trial trips, so that it afforded a fair road. We knew from the Indians and from a book that there were sand dunes to be combated, but there was a hope that some treads Doc had invented would enable us to snowshoe over them. These dunes covered the last 12 miles between the southern end of the Pinacates to the Gulf, and were by common report, a set of terrors. Nobody but the Sand Papagos had ever crossed them, for there was no water. "And," naively added our half-breed informant, "the water you do find is salt."

Equipment for the final dash to the gulf consisted of light bedding, 5 days' grub, cooking tools, 24 gallons of gasoline and three large canteens of water. The car held this load without inconvenience. It also left place for two to ride comfortably, which was a wonderful thing, considering the hardships we had intended to meet along the way.

At first we rode down a cactus flat, leaving the granite mountains behind and putting out for a series of black, lava-smeared volcanos. Between the break of the granite country and the volcanoes lies a smooth basin, where water collects and kills vegetation, for this basin is below the level of the passes that give outlet for most of the region to the sea. Up slopes of hard-packed sand that have not changed since they flowed, boiling, from the lip of the sand volcano, we drove, to the heights of the pass. On either side were jagged volcano peaks, wide expanses of jet-black lava, and cactus everywhere.

Twenty miles of this. Looking out for tires that may mean the saving of your life is plenty of occupation for the driver. Some big cactus burrs would tear a casing, perhaps. Almost any of the glass-like fragments of lava would permanently retire even the best of tires from active service, but, at last, we emerged on to a new flat, a "tuseral," as the Mexicans call it. And here was misery. Now, you'd scarcely believe it, but a mouse can bluff an elephant. Twenty million tusa rats can create a set of burrows that will totally spoil a hunk of desert as a motor road. And that habit of the tusa rats was what enabled us to reach the gulf.

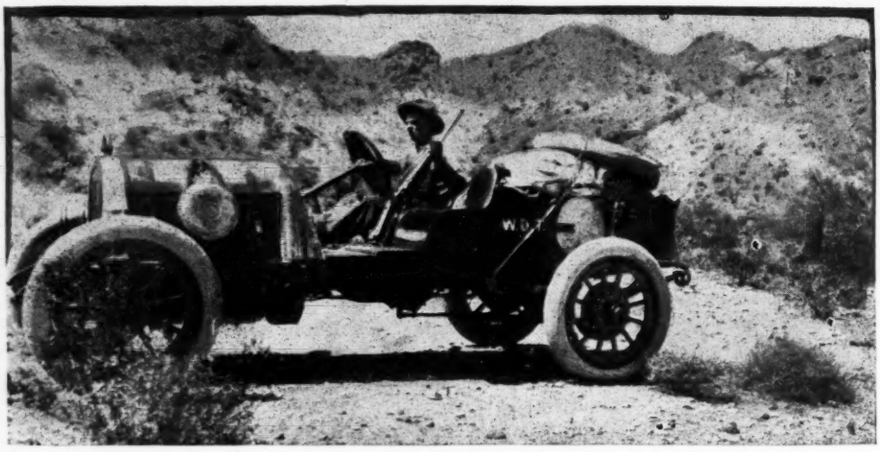
For they diverted us, first to cuss words, and then to the bed of a dry wash. This was tough traveling, but better than the eternal bumping of the tuseral. It led us away from the base of the Pinacate.

Far to the northeast is the Sonoita river.

Camp in Senoita wash, 10 miles from Gulf of California

Prospecting by motor car. The day of the pack burro is passing and now the gold-seeker pushes his car into regions that formerly appalled even the hardy pioneers of the pack train

Where it deserves the name of river, it affords a burro route and has since the day when the forty-niners went to California along it. But Sonoita does not remain faithful to the tradition of rivers. It twists suddenly southwest and casts off the habit of its kind for carrying any water whatsoever. Little knowing where we were headed, but distinctly on our way to escape the plague of the tusas, we followed the wash. Soon we came to mesquites, palo verdes and palo fierro, those desert plants that follow the course of the so-called rivers—rivers that carry actual surface water perhaps once in a year.



Ready for final dash to the Gulf—Here we have the car with one of the adventurers who made the trip into Mexico

Now, sand washes, very frequent in Arizona, had never proven amiable to motor cars. But in this land of strange things, one couldn't be surprised very much at what developed in the center of Sonoita river. It was a streak of silt-covered sand, a deposit from the slow-moving stream, and just as hard and smooth as a paved road.

"Looks like speed," said "Doc." "Sure," I mumbled through dusty lips, and he stepped on her.

A Dream of the Future

Sitting on the beach, surveying placid waters that we knew to contain the best fishing in the world, the hills at our backs full of game and strongly suspected of being speckled with possible future gold prospects, we planned for the motor-maniacs of Arizona. A boat-house rose in vision, on that beach. Behind it stretched a road, smoothed, straightened, culverted. On either side were permanent tinajas, made by man to resist the drying influence of the sun. The motor car adventurers of our home state need not take their lives in their hands, if we could just get these things developed. We would have it so the tired business man might quit his office in the forenoon and be at the gulf late that evening, for hunting, fishing and boating. Oh, it was some dream, all right. Then—

"Why in time didn't we bring that fishin' outfit?" asked "Doc," vaguely of me, and not apparently expecting a reply.

"Yeh. Why?" I returned, just as vaguely. "Anyway, jerked antelope or wild burro is good." And, with that piece of desert philosophy, we fell to cooking a delayed breakfast, hard by a hard won sea.

NEW FEDERAL TRUCKS READY

Detroit, Feb. 26—Five new Federal truck models have just been put on the market and will be exhibited at the Boston show for the first time. The capacities range from 1 to 5 tons, and two of these are new for the Federal company. These are the 1 and 5-ton models. The others are new models also but are refinements of the previous designs. They have capacities of 1½, 2 and 3½ tons. These five models are taken care of by three different engine sizes; one for the 1-ton, one for the 1½ and 2-ton, and the other for the 3½ and 5-ton. The engines are Federal designs and are similar throughout, as are the chassis of all five truck models in all important particulars. There are a few differences, however, which are necessitated by the difference in capacities. The most notable difference is that the trucks all have four speed gearboxes, except the 1-ton truck, which has three speeds. The 5-ton model is equipped with steel wheels with hollow spokes, whereas the smaller models are fitted with artillery wood wheels.

The prices of the chassis are as follows: 1-ton, $1,650; 1½-ton, $2,100; 2-ton, $2,300; 3½-ton, $3,000; 5-ton, $4,000.

JAY JOINS ENGINEERING FIRM

New York, Feb. 24—John C. Jay, Jr., has joined the firm of Jamieson, Houston & Graham, consulting engineers. The firm will be known as Jamieson, Houston, Graham & Jay. Mr. Jay was formerly chairman of the board of directors of the Maxwell Motor Co. and vice-president of the Pennsylvania Steel Co.

CARS BY THE SHOE ROUTE

The early bird catches the worm; likewise the early dealer catches the cream of the contracts. But the latter must needs do some mighty tall scratching with snow shoes if the snow on his territory happens to be 14 ft. thick.

So deep was the snow on L. R. Peart's territory in the northeast corner of Utah, at Logan, 68 miles north of Salt Lake City. Off hand one might say there was little chance to catch anything with wheels on that snow. For who could get a car through the drifts to even visit the farmers? Well, one got through or over, judging from the means of locomotion he used.

If the dealer could not get to the farmer because of road and weather conditions the farmer was also at a disadvantage, mused the dealer. He could neither come to town nor do much work on his place. Naturally he must have had lots of time to read the newspapers, farm papers and magazines.

Mr. Peart concluded the farmer was ripe for a sale and that now, snow or no snow, was the accepted time. He couldn't drive a car to the farmer, but he knew how to use snow shoes. He fastened on his snow shoes and started out. In three weeks he had eleven signed orders for Paige cars and cash deposits on all.

EMERSON HAS STARTED DELIVERY

Kingston, N. Y., Feb. 24—At the plant of the Emerson Motors Co., Inc., it was learned to-day that delivery of Emerson cars started the last week in January and that sixty-nine have been delivered to date. These cars have gone into twenty-one different states, and carload shipments have been made to such states as New York, Pennsylvania, Texas, North Carolina and South Carolina.

About eight Emerson cars were in different stages of completion on the assembly floor of the factory to-day.

The price of the Emerson has been increased from $395 without equipment to $545 with equipment. This equipment includes electric starting and lighting; speedometer; demountable rims; top; windshield; tire carrier; and 30 by 3½ tires all around.

A look through the orders of the purchasing department showed to-day that orders with specifications have been placed for parts as follows: Wheels, 5000 sets; front and rear axles, 5000 sets; tire pumps, 10,000; gearsets, 1000; carbureters, 5000; steering sets, 1000; radiators, 500; demountable rims, 5000 sets, and there were other ordered specifications, showing the extent to which the company is proceeding in its manufacturing problem.

J. W. Wellington of Sandusky, Ohio, has become superintendent of production at the Emerson plant. He was formerly the owner of the Mathews Engineering Co., Sandusky, Ohio, and is interested in several motor car companies. J. T. Beadle has been appointed purchasing agent. Mr. Beadle was formerly connected with a Jackson, Mich., company. He still retains his interests in that company.

Manifold Importance Increased

Carbureter Experiments Show Necessity of Pre-Heating to Obtain True Vaporization

THE importance of the manifold has grown with the descent of the grade of fuel. For the carbureter has ceased to be more than a measuring device, while true vaporization has become a duty of the intake manifold.

The influence of heat was discussed formerly as to the absence or presence of advantages offered by it in assisting the evaporization of gasoline. Now it is recognized as a necessity. The engine builder fully realizes the problem in taking care of the gasolines of low volatility, and each year more elaborate means for pre-heating the mixtures are used.

Stromberg Carbureter Experiments

The Stromberg Motor Devices Co. in Chicago has made some interesting experiments in its laboratory recently to show the action of gasoline after it leaves the carbureter under different degrees of throttle opening. A glass bell has been arranged over the carbureter outlet so the suction of the engine falls on the jet in the usual manner but the resulting mixture is thrown into the glass bell before being drawn into the engine. With this apparatus it is possible to study results with different carbureters and with different forms of manifold.

It is only necessary to watch the action of the mixture as it enters the glass bell to see the condition in which the fuel is entering the engines. Superficially, it is possible to observe that at low throttle openings the evaporization is practically complete and the mixture is entering the engine in the form of fog. This seems to be true with all carbureters and certainly was the case with those which were tried out during a recent visit to the laboratory. As soon as the throttle was opened, however, and the vacuum began to drop, instead of a fog the resulting mixture resembled the play of a fountain with large globules of raw gasoline entering the manifold.

Here the influence of manifold form became immediately apparent. With bends and elbows the raw gasoline was immediately baffled and collected in pools which slowly dripped down the sides of the pipe or were carried gradually to the cylinders, depending on the shape of the manifold and the conditions.

Pre-heating Intake Manifold

The reasons for this are not far to seek as they are evident from the hygrometric conditions of the gasoline vapor. With the higher test fuels such as we were using two years ago, the engine worked above the dew point or point of saturation of the mixture of ordinary atmospheric temperatures. With the present-day fuel we are below the dew point under the vacuum existing at wide-open throttle, unless provisions are made to pre-heat the intake manifold. To show these conditions clearly, some tabular matter has been prepared in the Stromberg laboratory. There are two tables—one covering octane (C_8H_{12}) and the other, decane ($C_{10}H_{22}$). The fuel of to-day may be represented in its characteristics by decane, while that of some time ago is approached by octane.

Result of Low Grade Fuel

In experimenting on decane, the report of the Stromberg laboratory states that decane is one of the main constituents of the more or less irregular blend of hydrocarbon elements now sold as gasoline. Its properties are typical because of the fact that its specific gravity is about that of the whole blend, 58 deg. Baume. In other words, it is midway in the range, there being as much lighter grade elements as of the heavier in 58 deg. gasoline.

As the fuel is normally discharged into the air from the nozzle in the form of drops or mist and must then be evaporated, there must be enough heat present to compensate for the drop in temperature which takes place during evaporization. For decane this requires about 43 deg. Fahr., so that in order to completely carburete the full charge of air, the entering air will have to have a temperature of about 152 deg. Fahr. in order that the mixture after evaporation should be 109 deg.

At any lower temperature it would not be possible to carburete a full charge of air so long as decane only was used, and the motor probably would run irregularly because the fuel in liquid form would run along the walls, puddle in all the straight passages or depressions in the manifold and go very unequally into the different cylinders.

Unvaporized Burns Incompletely

In the actual use of gasoline on a cold motor it is necessary to open the fuel jet and use enough more of the mixed fuel so that the deficiency in decane vapor and that of the heavier elements is made up from the lighter elements which vaporize more completely. The unvaporized portion of the heavier elements of course remains in the liquid form, travels to the motor very slowly along the walls, when it travels at all, distributes unevenly to the different cylinders and, when it is taken in, in the form of large drops, burns incompletely and with a considerable deposit of carbon.

The only thing which makes it possible to use the present-day fuel is that the motors are usually so large for their work that 98 per cent of their operation takes place while the charge is greatly reduced by throttling. This decreases the amount of vapor charge necessary and thus lowers the temperature necessary to run. For instance, if the throttle of the carbureter were closed so that there was only 26 per cent of a full air charge per cylinder, a complete vapor charge could exist at 68 deg. Fahr., or with an air admission temperature of 111 deg. Fahr. and so on.

These conditions can be compared to those that would exist if we had fuel which averaged, in properties, octane. The octane tabulation shows that it is possible, at freezing point or 32. deg. Fahr., to have a vapor charge of 31.2 per cent at a ratio of 15.2 to 1. The percentage of vapor charge reaches 100 with the octane at less than 68 deg. With the decane, which represents the fuel of today, it requires about 106 deg.

Complete Vaporization Necessary

Practically, this means nothing more than a proof of the necessity for preheating the manifold. The carbureter is seen with a fountain spray of large drops, which must be caught and evaporated in the intake manifold before they reach the cylinders. To get the proper distribution, complete vaporization is necessary, and the simple pre-heating of the intake air may not always fulfill the conditions. It must be remembered that there is a temperature drop during evaporation which robs some of the preheated air of its heat, and this must be made up in the intake manifold unless the initial air is heated to such an extent that a loss of volumetric efficiency occurs.

Where the entire matter will lead in the question of volumetric efficiency is something which cannot at present be foreseen. It seems quite certain that it will be impossible to use the same pre-heating arrangement for a car that is operating in a cold northern climate as for one in some of the southern states in summer. There is a difference in the atmospheric temperature of fully 100 deg. Fahr. and some compensation must be necessary if the same efficiency is to be secured in cold weather as in warm. It does not seem possible that a mean condition or construction will be satisfactory, and this means either thermostatic control or placing the temperature regulations into the hands of the driver.

Currying Your Motor Car

From the Woman's Viewpoint

"HOW do you keep your car clean?" Mrs. McCreery asked Mrs. Henlon.

"I do it myself," said Mrs. Henlon, "that's how. Of course, I could send it down to the corner garage, but if I do that I naturally won't send it every time it needs cleaning, and besides I have found a way to clean the car without making myself a fit subject for a vacuum cleaner, too."

"How in the world do you do that? Why, I once tried to clean my car and I had to hibernate for a week or more. Even pumice stone couldn't take all the grease stains off my hands, though it did take most of the skin off. And as for my clothes——"

All in Knowing How

"My dear, you went at it wrong," laughed Mrs. Henlon indulgently, adding quickly when she saw that Mrs. McCreey was about to take offense, "I did the same thing the first time or two I tried to curry our car, and it was all because I didn't know how. Most of the success in anything is knowing how these days, and it's the same way with cleaning a car."

"Well, I just feel like I ought to be able to get out and clean the car myself, without being dependent on a lot of men who don't think nearly as much of the car as I do," regretted Mrs. McCreery.

"Can you blame them for not thinking as much of it as you do," said Mrs. Henlon. "Why, of course you can get your car thoroughly cleaned at any reputable garage, but unless you keep your car there at so much a month for cleaning and so on, your car is pretty apt to get mighty shabby in the intermissions between the garage acts."

"Well, what can a body do, anyway?" almost wailed Mrs. McCreery, for she was very ambitious to have her car be as bright as it was before she learned to drive it. She was somewhat afraid strangers might think she could drive no better than her car could look. Which wasn't the case at all, as it happened.

Good Job in Few Hours

"Well, it takes 4 or 5 hrs. to do the job well," began Mrs. Henlon. "I sometimes think I could spend a whole day just messing around the car, but if you go at it right and use a certain general plan it shouldn't take you anything like a day, not at all. Though, if you slight the job, you'll find that you have scratched or dulled the finish in the hurry of slighting.

"If it isn't too cold to use the hose outdoors on the car, so much the quicker, though plenty of warm water, changed frequently, works just as well in the long run. You ought to have plenty of soft rags, a scrubbing brush, chamois, ivory soap and just lots of warm water, even if you do use the hose to get the most superfluous dirt off with. Then, of course there's the cleanser, sprayer and gasoline that go to making the cleaning easier.

To Get Caked Dirt Off

"You'll find that your running gear picks up the most of the road's dirt. At least it'll seem that way. This dirt should be soaked off, not knocked off, and it'll take some warm water to do it. The hose comes in handy here, as you can get a good deal of it off with the hose, and your fenders will be cleaner underneath also.

"No, I never worry about the spots and stains on the car until I've routed pretty nearly all the real dirt and dust. The hose won't take them off, no matter how hard you try. Just get all the top layers off, and use lots of soft rags to dry the body after it is washed. Be careful in drying, as the least little grain of sand, rubbed across by the rag, will leave a deep mark. Pat the car just like you would a baby.

"Now comes the cleanser. If you use a sprayer you need not get very dirty yourself, though my sister couldn't clean a car with a 6-ft. sprayer and not get dirty. You can use that soft, soapy cleanser that goes on with a cloth, but then you have to be careful about scratching again. Wipe the cleanser off with another soft cloth or chamois. The chamois is best, as you know from cleaning the piano with it.

Then It's Rub, Rub, Rub

"Well, next I go to polishing, and here's where you show what you're made of. The polish will go on with a sprayer, too, but that's just the preamble. You have to get it on evenly, which isn't so hard when you use a sprayer. Then, you begin to rub, and it's rub, rub, rub until you see mirages of wonderfully bright cars or your backbone buckles."

"Takes elbow grease, does it?" laughed Mrs. McCreery, who had been listening with all her senses to this impromptu lecture.

"Indeed and it does," said Mrs. Henlon promptly, "it's as bad as doing housework, but if you want to be proud of yourself, you'll keep on rubbing. If you wipe the dust off the car once in a while between these polishing-cleanings, you won't have to rub so much later, but if your car has gone through lots of weather and wear without any petting, elbow grease is the main story. When you get the polish on, all the results sit back and wait for the elbow grease to appear on the scene. The more you rub the better you will like the finish of your car—after you get through.

"It isn't so bad as it sounds, though," Mrs. Henlon interrupted herself. "You really get through before you know it.

"Now, you don't want to put any grease on the top. Use ivory soap and water for that. The top's casing is very particular. If you use polish, chemicals or soap on it you are likely to ruin its rainproof qualities. You know what happens when some poor tenderfoot accidently runs her hand along the tent roof or side. The curtains, top and slip covers all require particular care, though it isn't any more trouble to give them this care than it is to treat them wrongly.

Be Tender with Top

"Just run over the casing of the top with a damp cloth. Don't use any polish, chemicals or soap. You get the spots out of the slip covers with gasoline or benzine, much the same as from a skirt or coat, but you have to use the same care to lose none of the color. I clean out my car pockets, too, once in a while. You have no idea how much dust they can carry along with everything else they are stuffed with."

"How do you keep your car floor looking respectable?" asked Mrs. McCreery. "Mine sometimes comes back from a single trip looking as if it were weighed down with the discouragement of centuries, and nothing I do seems to help its spirits."

"Try a little turpentine," Mrs. Henlon advised. "There's nothing like it for helping the spirits, as you say, of the car floor. It will brighten the carpet up wonderfully."

"Do you have any trouble keeping your nickel fittings looking shiny?" asked Mrs. McCreery.

Works Like a Charm

"Well, not now, though I did at first," admitted Mrs. Henlon. "And when I did solve the problem it seemed too simple for any use. I just took some of the polish I use for my silver and tried that, and it worked so well I've been using it ever since. You don't have to rub any to speak of, and the nickel comes out just like brand new."

"How do you clean the windshield?" asked Mrs. McCreery.

"With my chamois," said Mrs. Henlon. "Of course you might use Bon Ami, if you want to, but I find chamois works just as well, and you are not likely to get any white from the Bon Ami on other parts of the car, where it sticks and is hard to remove.

"For myself, I'd rather rub a little more and use a chamois than have the black around the windshield come out grayish.

Without Utilizing a Proxy

"Now if you use much gasoline in your cleaning and get any of it on the finish you will find that it may deaden the luster somewhat, so you want to be mighty careful. It isn't really necessary to use gasoline in cleaning. With the cleanser and polisher you do very well. The few spots on the covers can be removed with a very little gasoline, or you can use some of the patent cleaners you have in the house for different purposes."

"And do you keep clean doing this?" asked Mrs. McCreery.

"Well, I can't say that I'm spotless when I get through, but maybe if I didn't go after the car so hard I would be. I guess you could wear a long coat or overalls and gloves and come out clean," mused Mrs. Henlon.

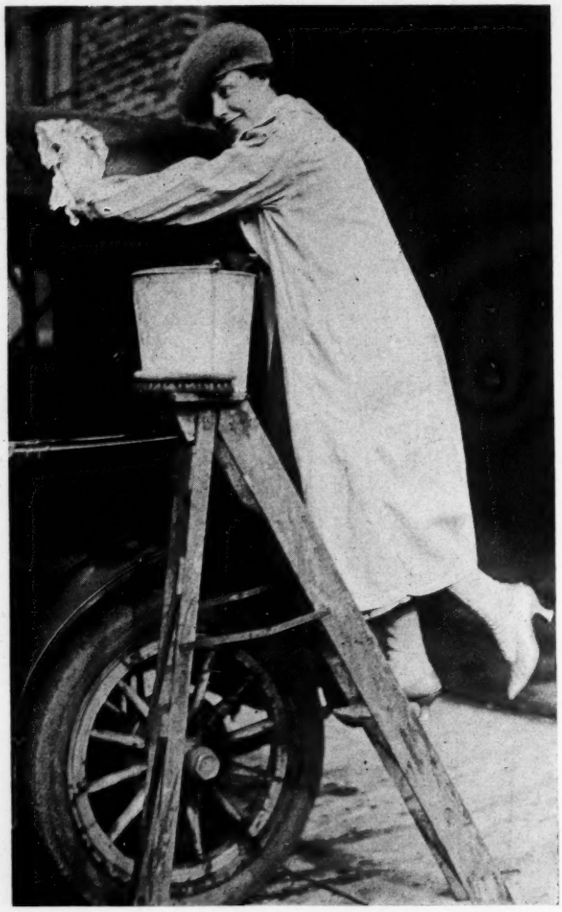
"Well, I'm going to clean my car that way once, anyhow," said Mrs. McCreery with determination as the two parted.

First you get a car; then you take it out and get it dirty, after which there follows, as night the day, the cleaning process. What a car has that person who after every spin goes over the entire car with a soft duster! Do you do this?

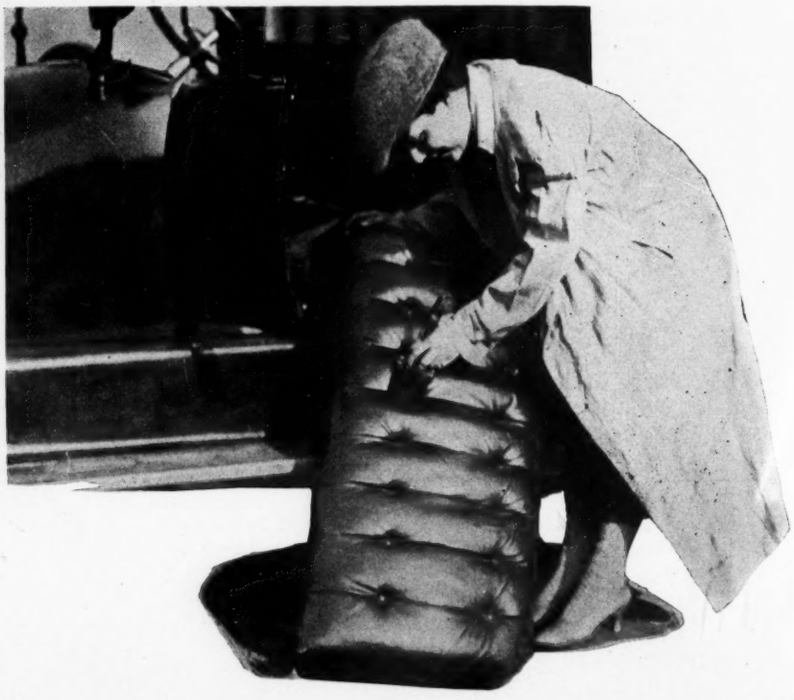
It is well to go over the car with a soft duster, because if you try to polish the car with the dust still on, you will make ugly scratches on it and do more harm than good. The body polish can be applied with a sprayer. This is much cleaner for you, and it throws the polish on evenly. It also is an economical way of applying polish

After spraying the polish the car should be rubbed with a soft cloth until the desired brilliancy is obtained

After rubbing the body with a soft cloth you will want to attack the top probably. The best weapons for this purpose are the same weapons that are used to vanquish a soiled panama hat. Rubberized cloth or mohair tops should not be cleaned with oily preparations. Oil hardens the rubber so that the rubber cracks when exposed to the sun. Go after the top with a scrubbing brush and use castile soap and warm water. Make plenty of good soap suds



After you have soaped the top thoroughly with your castile soap and warm water be sure to rinse the suds off, for it is about as important to get the soap out of the top as it is to get it out of your hair after a shampoo. The top should be dried completely with a cloth

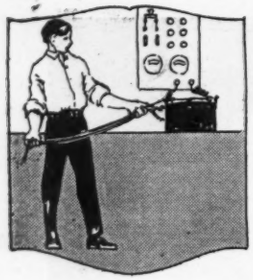


When you have done all the damage you can to the body and top, tackle the upholstery. For if the upholstery is neglected the car will soon look shabby, no matter how much you clean it externally. Moreover, the wearing apparel of the riders therein the car will not relish poorly kept cushions. The best way to remove the dust, especially if your car seats have any buttons in them, is with a stiff paint brush. The brush routs out the dust from folds and button crevices successfully, besides being handled easily

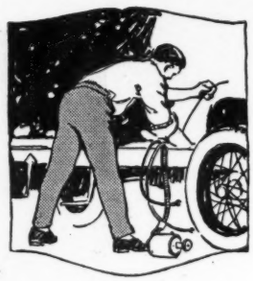
Last comes the engine. Naturally the woman motorist dreads to attempt to clean the engine, and naturally it is best that she attempt no more than to clean it, if she is a novice in mechanics, but she can use the gasoline blower, which sprays the engine with gasoline, without hurting any of the car's feelings or her own—hands. The gasoline loosens the dirt and grease so they can be removed easily

After the gasoline has been sprayed use a big sponge, and you will be able to wipe off the surplus dirt and grease without collecting any unerasable marks on yourself

If you wear a slipover coat and use the various sprayers and change dusting and drying cloths frequently enough you may finish the job as this motorist did—"Not a spot on my frock—hands as clean as when I began the work—I did it—so can you"



Electrical Equipment of the Motor Car



By David Penn Moreton & Darwin S. Hatch.

Editors' Note—Herewith is presented the thirty-third installment of a weekly series of articles begun in MOTOR AGE *issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently. It is expected that the book will be published about April 1.*

Part XXXIII—Motor and Engine Connection

THE chief function of the starting motor is to turn the gasoline engine over at such a speed that it may be started readily, assuming the position and intensity of the spark, as well as the gas mixture and all other conditions under which the starting motor must be capable of operating the engine, in the majority of cases is between 100 and 200 r.p.m. If the starting motor is connected to the engine in such a manner that it must operate at the same speed as the engine, it is evident that it must be capable of developing sufficient torque so that the torque available at the gear or pulley on its shaft is just equal to that required to drive the engine at the desired speed.

On the other hand, if the connection between the motor and engine be made in such a manner that the motor may run much faster in r.p.m. than the engine, the torque the motor must be capable of producing at the gear or pulley on its shaft will bear, neglecting losses, the same relation to the torque required to drive the engine as the speed of the engine bears to the speed of the motor.

For example, if a certain engine requires a torque of 20 pound feet to drive it at a speed of 150 r.p.m and the starting motor is geared to the engine in such a manner that it operates at forty times the speed of the engine, then the torque the motor must be capable of delivering at its gear or pulley will be, neglecting losses, equal to one 1/40 of 20 or .5 pound-feet. The losses between the gear on the motor shaft and the shaft of the engine must be taken care of by the motor in addition to driving the engine; that is, the actual torque of the motor will always be greater than the theoretical torque required, due to these losses. The losses in some gear types of transmissions may amount to as much as 40 per cent, while the manufacturers of certain types of chain transmissions claim the losses are as low as 5 per cent.

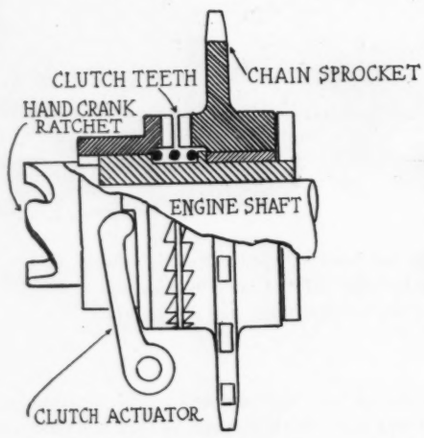


Fig. 193—Type of clutch first used in connecting starting motor to engine

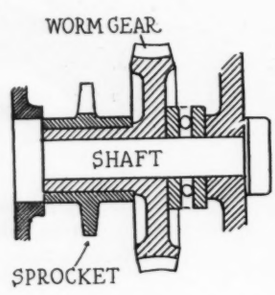


Fig. 194—A further detail of the same clutch. It is little used

The size of an electric motor capable of delivering a certain horsepower depends on the speed at which the motor is to be operated, there being an increase in size with a decrease in speed and, conversely, a decrease in size with an increase in speed. On account of the limitations in size of the starting motor, due to space and weight requirements, it is obvious that it would be better to have the speed at which the motor operates greater than the speed of the engine. There are several exceptions to this last statement, and the principal ones are found in the U.S.L. outfit, the Woods dual power car and the Owen Magnetic, all of which will be explained in detail later.

Connection Between Motor and Engine

The main requirement of the connection between the electric motor and the engine is to provide a positive mechanical connection so that the power developed by the motor may be transmitted to the crankshaft of the engine. This mechanical connection is required only when the motor is driving the engine, and the construction and operation of the intermediate device should be such that power may be transmitted in one direction only. This can be explained better by assuming a definite case.

Suppose the ratio between motor and engine speeds in a certain installation is 30 to 1 and that the motor will operate the engine at 125 r.p.m. When the engine starts to fire, it is operating at approximately 125 r.p.m. and the motor is operating at 3,750 r.p.m. The speed of the engine will increase, and when it reaches a speed of 500 r.p.m., the speed of the motor will be 15,000, which is considerably above the safety limit, and the motor should be disconnected from the engine long before this speed has been reached.

Several different devices are employed to overcome the above difficulty, such as the ordinary jaw clutch similar to that employed on all hand cranks, friction clutch, roller overrunning clutch, ratchet-and-pawl overrunning clutch, worm-and-worm-wheel, Bendix drive, electromagnetic-operated pinions, mechanically-operated pinions, etc.

Overrunning Jaw Clutch

A type of clutch similar to that used in connecting the starting crank to the crankshaft of a motor first was used in connecting the starting motor to the engine. This clutch consists of a number of jaws on two opposite surfaces with their backs beveled and arranged so that they will mesh with each other; but power can be transmitted in one direction only, as the jaws will slide past each other when the portion of the clutch being driven tends to exceed the speed of the driving portion. This type is little used, due principally to the fact that it gives a clicking noise when the engine runs away from the starting motor, as it will do imme-

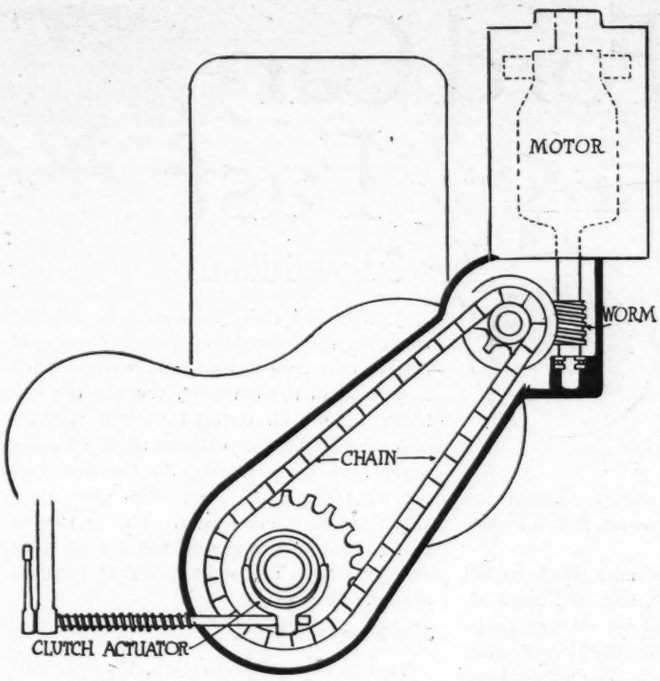


Fig. 195—The motor turns the sprocket through the worm-and-worm gear. When the engine runs away from the motor the clutch gives a clicking noise.

diately after each piston has passed its position of maximum compression.

An example of the application of a clutch of this type is shown in Figs. 193, 194 and 195. When the upper end of the clutch actuator is moved toward the right the left-hand portion of the clutch shown in Fig. 193 will move along the end of the crankshaft, and the teeth become engaged with the teeth on the surface of the large sprocket. This sprocket turns freely on the end of the crankshaft when the clutch is disengaged, being driven by a chain which runs over a second and smaller sprocket mounted on a shaft as shown in Fig. 194, which in turn is driven by the starting motor through a worm-and-worm gear as shown in Fig. 195. As long as the large sprocket in Fig. 193 tends to turn faster in a clockwise direction, as viewed from the left-hand end, or front, of the engine, than the left-hand part of the clutch, the two portions of the clutch will remain engaged, but just as soon as the speed of the engine exceeds that of the large sprocket the clutch becomes disengaged and the two surfaces move relative to each other, giving a clicking sound.

Overrunning Roller Clutch

There are several different forms of roller clutches, but in principle they are the same. For this reason a typical form, such as the one used by the Gray & Davis Co. will be described. The construction of the clutch is shown in Fig. 196 and it consists of two principal parts, the outer ring R and the clutch center C. The outer portion of the clutch may be driven by gears, chain drive, or it may be rigidly connected to the driving shaft. In this particular case power is transmitted to R by the pinion P, and it is arranged to drive the inner portion C in a clockwise direction. Several slots are cut in the outer surface of the portion C, four in this particular case, and the depth of these slots varies from one side to the other, being deeper on the right-hand side of each slot when the slot is in its uppermost position.

Rollers are placed in these slots as shown at B with their axes parallel to the axis of rotation of the clutch—that is, the rollers are parallel to the shaft E—and they are held away from the deeper side of the slot by a suitable plunger, C, and spring, D. The diameter of these rollers is a little greater than the depth of the slots on their shallow side, and as a result the springs cannot force the rollers completely over against the side of the slots. When the outer ring R of the clutch is rotated in the direction of

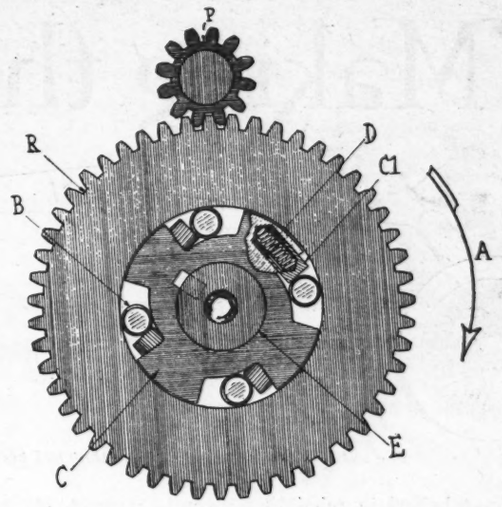


Fig. 196—This illustrates the principle of the over-running roller type clutch

the arrow A the rollers will be wedged between the inner surface of the ring R and the bottom of the slots. With the rollers thus wedged tightly between the two parts of the clutch, the inner part C will be rotated in the same direction and at the same speed as the outer portion R, and power may be transmitted from R to C, which in turn may be connected through gears, chain or direct, to the crankshaft of the engine. In this particular case the inner portion of the clutch is keyed to the shaft E.

Just as soon as the starting motor starts to revolve the pinion P the outer portion of the clutch will start to revolve, and the locking action just described will take place between the two parts R and C almost instantly, which results in the cranking action taking place at once. This cranking action of the motor will continue until the engine starts to fire, when its speed will increase. This results in the speed of the inner portion of the clutch exceeding the speed of the outer portion, and the two parts no longer will be locked together, as the rollers then will tend to roll into the deeper part of the slots, due to the fact that the piece C is traveling faster than the inner surface of the piece R, and the direction in which the rollers turn about their own axes will be just the reverse of what it was when the piece R tended to turn faster than the piece C. The starting motor is now running idle and may be stopped without interfering in any way with the operation of the engine.

In some cases a double overrunning clutch is employed as shown diagrammatically in Fig. 197. With a double combination of this kind the machine may be operated at one speed when acting as a motor and driving the engine and at another speed when it is being driven by the engine and acting as a generator.

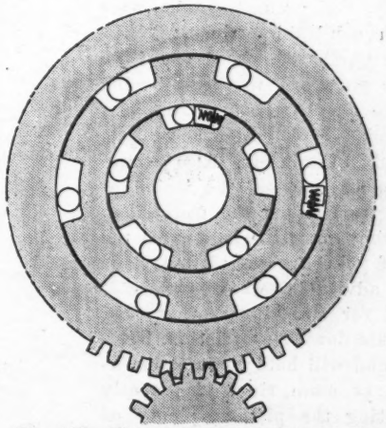
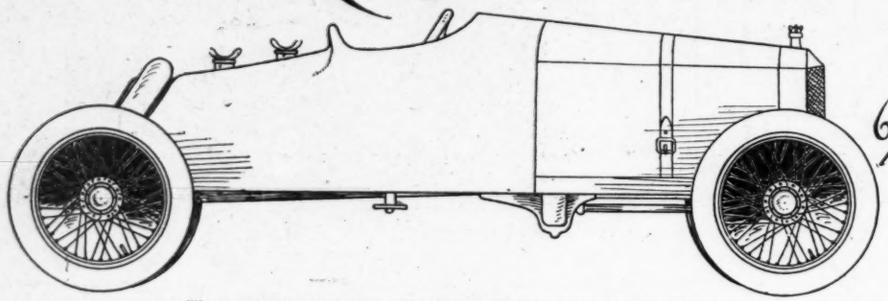


Fig. 197—The double overrunning roller type clutch used by the Northeast company

Making the Ford Car Fast

by E. B. Williams



The author's model of a Ford car that has been made fast

AS I have helped in rebuilding several Fords that turned out exceptionally fast for the money invested in the job, I believe that I have gained some experience that may be of value to others, so will set down what I have learned, and it may be taken for what it is worth.

There have been a few jobs turned out that ran into the thousands, you might say, and that were Fords in name only when finished. Of these I will have little to say, taking it for granted that what is wanted is something that is within the ordinary man's reach, both i na pecuniary way and, if he delights in doing his own work, in a mechanical way.

Two Parts to Work

The work naturally divides itself into two parts, the engine and chasis, or running gear. I will discuss the engine first, it being the most important part.

The engine, as it comes from the factory, has bored cylinders, and as it is impossible, especially in a commercial way, to bore a perfectly true cylinder, the first thing you should do is to have your cylinders reground by a competent machinist, one who makes a specialty of this sort of work. Then you have a set of cylinders that are in line, have equal bore all the way through and are as near round as it is possible to make them.

The pistons I have used were cast of aluminum alloy, of course, and were equipped with non-leaking rings. Whatever make is purchased, or if you have them made to order, see to the following things: There should be a rib or reinforced run from the piston-pin boss up to the piston head on the inside. Also several ribs should be cast across the inside of head. This both stiffens the piston and helps in carrying away the heat from the explosions. If you have the pistons made to order, it is advisable to have them cast and machined for two rings rather than three. This cuts down ring friction, lightens the part, and will hold compression as well as three or more rings if properly fitted. In fitting the pistons, plenty of clearance must be given—from .007 to .008 being about right. This may seem excessive, but remember that the expansion of aluminum is much greater than of cast-iron.

This large clearance may lead to oil pumping and foul plugs, and so I have always turned and drilled an oil groove in each piston just below the lower ring groove as shown in Fig. 2. The grooves are about $\frac{1}{16}$ deep and $\frac{3}{16}$ wide, having the lower corner rounded off. There are eight $\frac{1}{8}$-in. holes drilled through the groove at equal distances around the piston, slanting down toward the inside. The top corner of the ring that is fitted in the ring slot just above this groove should also be slightly rounded. As the piston goes up the rounded edge of the ring and the groove tend to slide over the film of oil on the cylinder wall, while in going down the sharp lower edge of the ring scrapes the oil in the grooves and it runs through the holes to the inside of the piston, and thus back to crankcase.

Lapping Rings to Fit

The rings should be of some good non-leaking type, or at least be step cut. Fit them in the cylinder with a gap of about .004, then lap them to a fit. In lapping them in, they should be placed on an old piston, cast iron is best, and worked back and forth in the cylinder, keeping the cylinder walls well covered with a mixture of exceedingly fine carborundum or some other abrasive and oil. As the piston is moved back and forth, also give it a slight rotating movement. I have used a tool similar to the one shown in Fig. 2 for this purpose. The wrist pin goes through the hole shown.

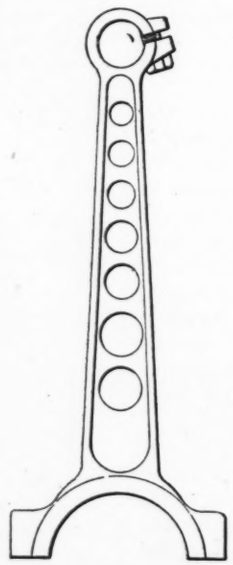


Fig. 1—The connecting rod has been lightened by dressing with file and drilling holes through inside web

Job Repays Trouble

This is a long tedious job, but you will be well repaid if it is properly done. It takes from 1500 to 2000 miles to wear in a set of rings under running conditions. Be sure and get all the abrasive from the cylinder walls and rings after the lapping is finished, or it will continue after motor is set up.

You can lighten the connecting rods considerable by dressing them up with a file and drilling several roles through the inside web. This does not dangerously weaken them, judging from my experience. Do not drill any holes in the last inch toward the bottom, as this is where the most strain comes, and anyway this part of the rod is more of a rotating than a reciprocating mass. In one car the rods were chucked up and the lower ends turned out and bearings made of Kelly metal were cast, turned to fit and installed. After 2500 miles of driving, most of it at high speed, the motor was torn down and these bearings showed practically no wear. This metal, if used, must be fitted with plenty of clearance.

Large Valves Are Better

You will secure better results if the valve ports and pockets are turned out and larger valves used. No trouble is liable to be encountered in boring the seats and ports from the top, but when going in from the side the tool will sometimes break through, and you will have to have the hole welded. It is best to do this before regrinding the block, as the heat, if welding is necessary, will warp the walls surrounding the weld. The ports can be enlarged $\frac{3}{16}$ in. and this is necessary if you expect good results. I have used tungsten steel valves, giving the stems plenty of clearance.

The springs must be stiffened considerably, either by installing heavier springs, or by placing spacers between the upper

ends of springs and the cylinder casting.

It is good practice to install valve adjusters, using the kind that screws into the valve push rod, it being necessary to anneal, drill and tap the rod. While you are about it, drill the length of rod to the head, but not through. This lightens the part and cuts down inertia, thus helping the valves to close quicker.

At this stage we come to the camshaft, which should be of the high-speed type if you can afford it, several different makes being on the market. I have secured good results with shafts taken from Ford cars of 1912 or earlier vintage. You will find them considerably different from the new type. If the regular shafts are used do not try changing the timing, as one tooth on the coarse pitched timing gears of the Ford throws the timing out too much.

Necessary to Shorten These Screws

Leave out the magneto field coil assembly, and remove the magnets from the flywheel, screwing back the brass screws and brass magnet supports only. It will be necessary to shorten the screws a little. They will kick up almost as much oil as the magnets, and considerable drag will be removed.

Now see that the crankshaft is perfectly true, then assemble the crankshaft and gearset and try out in the lathe, first seeing that the bushing in the driving-plate assembly is a good fit on the gearset gearshaft. If there is any wobble it will probably mean turning up both sides of the gearset-shaft flange and the back side of the crankshaft flange. Now reassemble and turn up the flywheel if necessary to make it run true. Take out the assembly and try on two perfectly level knife-edge testing bars for balance. If one side of flywheel turns down, take out material on that side until the wheel stays where you turn it. This may seem a lot of trouble, but it is essential that these parts be true and in perfect balance.

Gearset May Affect Bearings

The power and added strain at high engine speeds will sometimes cause the gearset to whip out the babbit bearing at the rear in what is called the front ball cap. This will in turn loosen up the rear main bearing. I have found it advisable to turn out the ball cap and equip it with a bronze bushing, fitting it rather loose on the gearset driving-plate assembly shaft to give lots of room for oil.

It is good practice to fit some auxiliary oiling system besides the gravity one with which the Ford is equipped. If money is no object a force feed system can be installed, which should have leads running to all four cylinders, being tapped through the walls on each side near the bottom of the cylinders and also a large lead running to the front of the crankcase. I have secured good results by cutting a ⅞ hole near the top of the gearset case on the right side and running a piece of brass or steel tubing, also ⅞, to empty into the

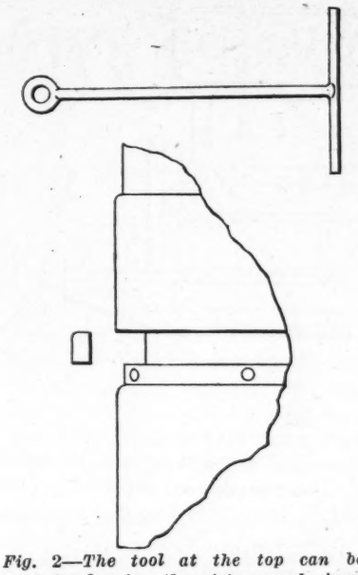


Fig. 2—The tool at the top can be used for lapping the pistons and rings. At the bottom is illustrated the preparation of piston and ring to prevent oil going into cylinder

timing-gear case as per Fig. 4. The front end need be only a snug fit in the case, but the rear end must have a flange which can be bolted to the gearset cover, using a gasket between. A sheet-iron partition can be installed just back of No. 4 cylinder. This can be made as high as it is desired to carry the oil level under the connecting rods. Of course every car intended for long distances should also have a hand oil pump convenient to the driver which will force oil from the reserve oil tank to the front of the engine.

High-Tension Magneto Discarded

While I believe a good high-tension magneto to be the best ignition on earth, I have discarded it in Ford work on account of the additional power needed for driving. Turning a magneto armature over at two or three thousand revolutions a minute requires more power than is generally thought, in my estimation. I have used a battery distributor system because it is light, is easily driven and works on the open circuit idea, thus requiring only four or five dry cells for juice.

Some additional cooling is needed. I have found the large V honeycomb type of radiator to be best. You will find that it will probably be unnecessary to use a fan with one of these. If you are building a streamline body it will be better to have some radiator maker build one of the tall narrow kind to order, or you may purchase a stock radiator. If it is necessary to use the original radiator, have a good tinsmith build on an extra tank to the top, either back under the hood, or point it and extent it out in front. Anyway, the original equipment must be improved upon for fast work.

For carburetion I recommend a 1¼-in. type, with a 1¼-in. built-up steel-tubing manifold. The one illustrated in Fig. 5 has given good results. No cast manifold is efficient, as the rough surface inside, with possible fins and irregular turns, seriously hampers the flow of gas.

Air Pressure Necessary

Each end of intake manifold has a collar brazed or welded about ⅛ in. from the end; also the exhaust pipes, which are of steel tubing and run straight out through the hood. A copper-asbestos gasket is slipped over the end of manifold and makes a tight fit between the collar and the cylinder casting. Manifolds are held on by crows' feet, which slip over the original studs and bear against the outside of the collars. It will be necessary to use air pressure on your gas supply as the carbureter should be set high, thus shortening the manifold.

When we come to the running gear we have two things to consider. If the car is to be used for fast track work only, by all means lower it. But if you want it for other work too, you will probably have to leave it up in the air, and sacrifice some efficiency.

The best way to lower the front end, to my notion, is to have a new axle made similar to the one illustrated. It may be either a forging or of cast steel. This

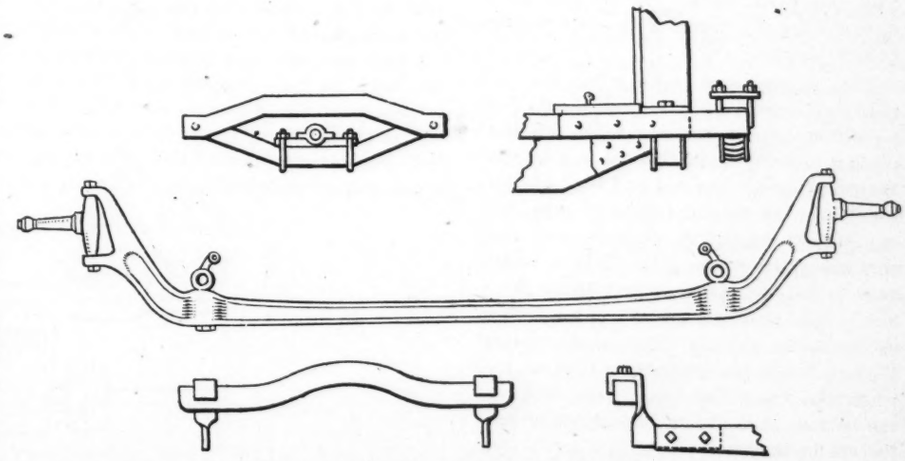


Fig. 3—Top—Method of lowering front end of frame by lengthening frame out and installing extra front cross member. Center—Dropped front axle. Bottom—Method of lowering rear end of frame 4 in.

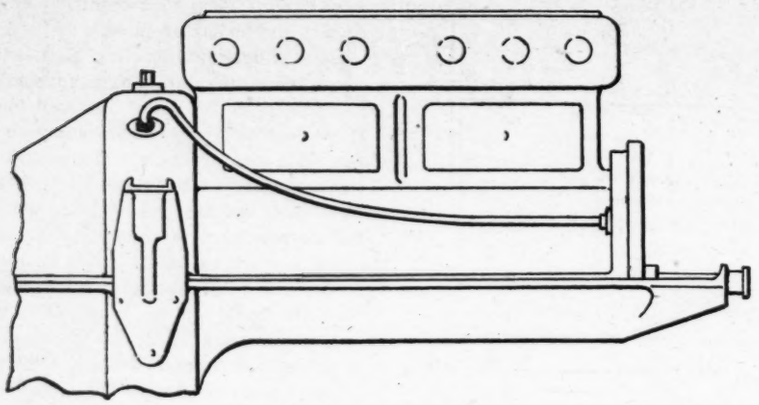


Fig. 4—One auxiliary oil system

leaves your frame strong and rigid, and an added advantage is that your radius rods are still in a straight line.

The rear end of the frame can be lowered by cutting off the side members just in front of the rear cross member and using steel forgings as shown in Fig. 3. The front end, if a cheaper construction is desired, may be lowered as shown in Fig. 3, by riveting pieces of channel iron on the sides of the frame, letting them stick out in front about 5 in. An extra cross member, similar to the regular Ford front cross member but with a high instead of a low center, is riveted across the front to the two new side extensions. This sets your front axle ahead enough to clear the radiator, and the amount of frame drop depends on the shape of your new cross member, as can readily be seen, which carries the spring. With this method it will be necessary to lengthen out your radius rods and the starting crank.

Assembly Should Be Kept Rigid

In tilting the steering post it is desirable to keep the assembly as rigid as possible. Have it bolted to the dash securely, blocking behind the dash plate with a wedge-shaped piece of hardwood shaped to fit the space caused by lowering. It will be necessary to drill a new hole in side of frame for bolting down the bracket. You can block under the bracket where it tips from the frame with steel washers before bolting.

The steering-gear connecting rod and the spindle-arm connecting rod should both be stiffened. An easy way to do this is to place a piece of small channel iron or steel tubing alongside the rod and bind the two together with several layers of tape, taping the whole length of rods, and then shellacing the whole job. This is cheap, easy to do, and makes a permanent job.

See that the axle tips toward the back of the car at the top. The nearer vertical the axle is set, the harder it is to steer, and when the top of the axle gets ahead of the bottom, it is almost impossible to keep the car in the road.

A good gear ratio for a car put up like this one about 2 4/7 to 1. While I have always made my own special gears, several concerns are making and advertising them. Some makes sell for $15.

While you have the rear end down see that the differential gears are a good fit on the inside ends of the axles. These sometimes get loose and tear the key seats out of the axles.

The rear hub brakes on the Ford were only intended for holding the car when standing still, and if used when running they do not last long, and are not very efficient at that. The best brakes I have used so far were secured from Los Angeles, Cal., costing $16 per set. They have large drums and external contracting bands lined with Raybestos.

Be sure and see that the transmission bands are a perfect fit on the drums and are not adjusted too tight. They can set up quite a drag if not properly set.

Speed Thus Obtained

I had one of these cars do 68 m.p.h., and another one equipped with wire wheels 71. Of course, if economy is no object a new cylinder head with overhead valves and camshaft, wire wheels, etc., can be added, the stroke lengthened and in this way a few miles per hour gained, but for the man of moderate means the foregoing described car will go fast enough and furnish lots of pleasure in the building.

The job I have described will run from $200 to $350, depending on how much of the work the builder is able to do himself.

I have not taken up the construction of the body, as that depends upon the taste or ability of the man who is building the car, also upon the use to which it is to be put. For racing a pair of bucket seats and a gas and oil tank bolted to the frame will get by very well, but are not comfortable or very clean. The body shown in the illustration is good, being neat in appearance, can be made comfortable, and offers little resistance to the wind. While it is not drawn to scale, the proportions are near enough right to give the idea. There is a gas and oil tank in the rear compartment, with the spare being slung on the extreme rear. This body should cost you about $150 at the average body builders.

Don't forget your hood straps, and have them very substantial.

MAKES TIRES IN STORE WINDOW

Detroit, Feb. 24—The B. F. Goodrich Co. has installed two complete machines for manufacture of cord tires in the window of its branch here and has factory workmen operating them.

REGISTERS MILLION DOLLARS

Boston, Mass., Feb. 28—It is estimated that the motor cars registered in Massachusetts last year reached a total valuation of $100,000,000. With that as a basis and figuring that the rest of New England had about as many cars as the Bay State it would give a $200,000,000 valuation for the cars.

Last year 257,538 cars were registered in New England for the fiscal year. That means a few more listed in December, for the year ends early in the month for most states, so returns may be made to the legislature. Of this total 40 per cent were Massachusetts machines.

The Bay State registered 117,895 machines. The other five had 139,743 machines. And when the 1915 figures are compared it shows an even growth in the registrations, for of the 197,230 cars listed that year 90,673 were Bay State cars. There was an increase in registrations for all New England of 61,308 machines, and Massachusetts had 27,122, or more than 40 per cent.

GRAMM-BERNSTEIN SALES . .

The Gramm-Bernstein Motor Truck Co., Lima, Ohio, retains the general marketing of Gramm-Bernstein trucks. The R. E. Taylor Corp. is distributor for New England, New York, Maryland, Delaware, District of Columbia and eastern half of Pennsylvania—not for the entire product of the factory as seemed to be inferred by an item in MOTOR AGE issue of Feb. 15.

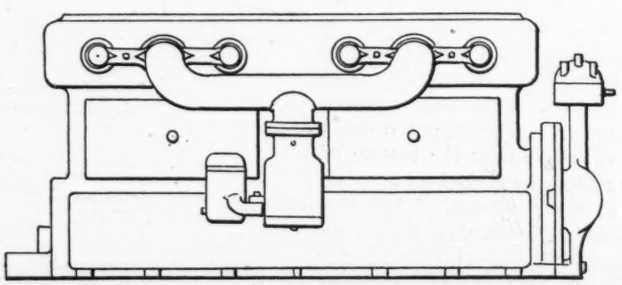


Fig. 5—Ford block showing installation of built-up manifold, carbureter and ignition apparatus

The Motor Car Repair Shop

YOUR OWN IDEAS

EDITOR'S NOTE—Ed Bowman, Horse Cave, Ky., comes through with a novel way of fitting bearings. He makes the bearings fit themselves in. In other words he runs them dry and smokes them to a fit. It is a rather unusual way of doing things and at first thought might appear rather dangerous. But, if the job is handled with great care, and the operator plays the safe side at all times to prevent the bearing metal from burning or melting, there is no reason why this should not be very good. This method of Ed Bowman's seems to be something easier and quicker than the usual method. Possibly some other MOTOR AGE *reader does it another way with satisfactory results. Let us have your way of doing it.*

Farmer Brown, who owned land adjacent to Farmer Smith, was the more wealthy of the two, because his initial capital permitted him to equip his farm with more modern tools and implements. Both had about the same number of acres, and it was equally valuable as agricultural land.

As each year rolled around Farmer Brown got more for his crops than Farmer Smith because he had the facilities to turn out more bushels per acre. Still, they both received the same figure for their produce, and they could have sold any amount more if they could have raised it.

One day Farmer Brown called on Farmer Smith and asked him "how's crops." Smith was optimistic but admitted he lost a lot of money because he did not have the proper equipment. Farmer Brown was a competitor—but neither had trouble selling his entire output. Therefore, Farmer Brown loaned Farmer Smith the money to buy implements and tools and now they are both doing a greater business because of this co-operation.

Suppose Farmer Brown was Garageman Brown and Farmer Smith was Garageman Smith, and it was not money that Smith needed, but ideas. If Brown showed Smith how he did things in his garage, they would both benefit by it—and serve the public better.

If you are using some home-made device that you think is mighty good send it to MOTOR AGE, and let us give it to some other repairmen through these columns. They have some ideas that they will, in turn, give to you.

Send us rough sketches of what you have made and find useful. Send us repair hints and kinks you have adopted to save time and money in maintaining a car. Read the two printed on this page this week. Didn't you get ideas out of them both? Then, give an idea in return.

Two Ideas Already Received

Island, Ky.—Editor MOTOR AGE—In Fig. 1 is a sketch of a home-made press for removing timing gears, gearset gears, bushings, making replacements, etc. This has been an important equipment in my shop for the last 2 years. It is made up of the following material:

1—Oak piece 6 by 8 by 38 in.
2—Oak piece 4 by 6 by 38 in.
2—Oak piece 2 by 6 by 53 in.
2—Oak piece 4 by 4 by 10 in.
2—12 by ½ in. bolts.
2—68 by ⅞ in. bolts.
2—Strips iron ½ by 2 by 24 in.
1—Heavy ratchet screw jack for gear pulling.

In using this press you put the axle or shaft or whatever you may be working on between the upper beams and the jack. Then, by placing a U-shaped iron, an old magnet closed to fit the work, between the gear and the upper beams the gear can be easily removed.

In removing bushings and bearings you will have to make some small punches slightly smaller than the bushing or bearing. These should be brazed to a flat bar of iron, say 3 in. wide and ½ in. thick. The punches can be made out of old buggy spindles sawed off to about 2 in. in length, with the smaller end brazed to the plate so as to clear the sides when removing bushings and bearings.—W. C. Ferguson.

Horse Cave, Ky.—Editor MOTOR AGE—I wish to tell you of a method we use in fitting up bearings. So far as I know we are the only ones using this system, and I will give you a detailed description of the process and the results we get.

We have a 3-hp. gasoline engine bolted to a short line-shaft on which there is a fixed pulley and an idler pulley. This line-shaft is in the frame that we bolt the motor block on. On the end of the shaft there is a starting-crank ratchet which, after the block is in place, engages with the fan-drive pulley on the crankshaft.

The bearing caps are removed and enough shims are removed to make a snug fit on the bearing that is to be fitted in. The caps are then replaced and bolted to a loose fit. The power is then applied, and if the cap is too tight the nuts are backed off, and if too close they can be tightened while the crankshaft is in motion. The nuts are tightened an equal amount until the bearing begins to smoke freely.

The cap is then examined, and if it does not show a fit all around and the full length of the bearing, the process is repeated. If the bearing is very high in spots the hand scraper is used, and if it is too low or too loose a fit, more shims are removed or the cap is filed down. This method is kept up until a perfect fit is shown the full length and all around the bearing. One bearing is fitted at a time, and the other bearings are kept well oiled.

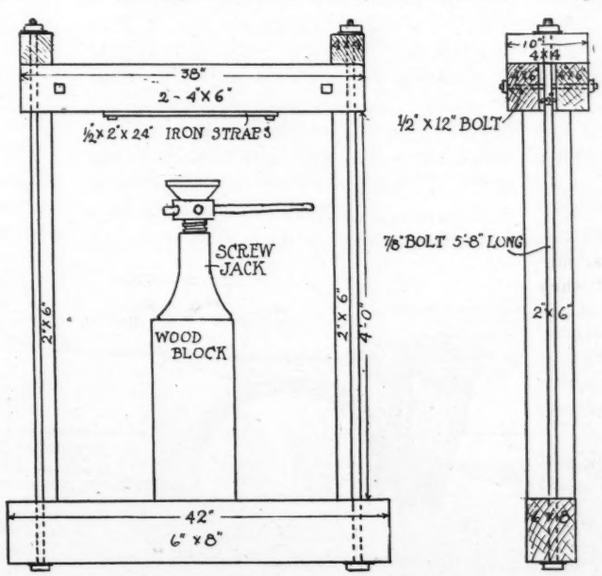


Fig. 1—Home-made press

Bearings fitted in this manner show up perfect in the Prussian blue test. I used this method for the first time about 4 months ago on a Ford block. Since then this car has seen some severe service, being run in a rough country and in use every day, and to-day this engine is exceptionally quiet. I have since used this method on several other engines and always get good results. If there is anything wrong with my method I cannot find what it is.—Ed Bowman.

The Readers' Clearing House

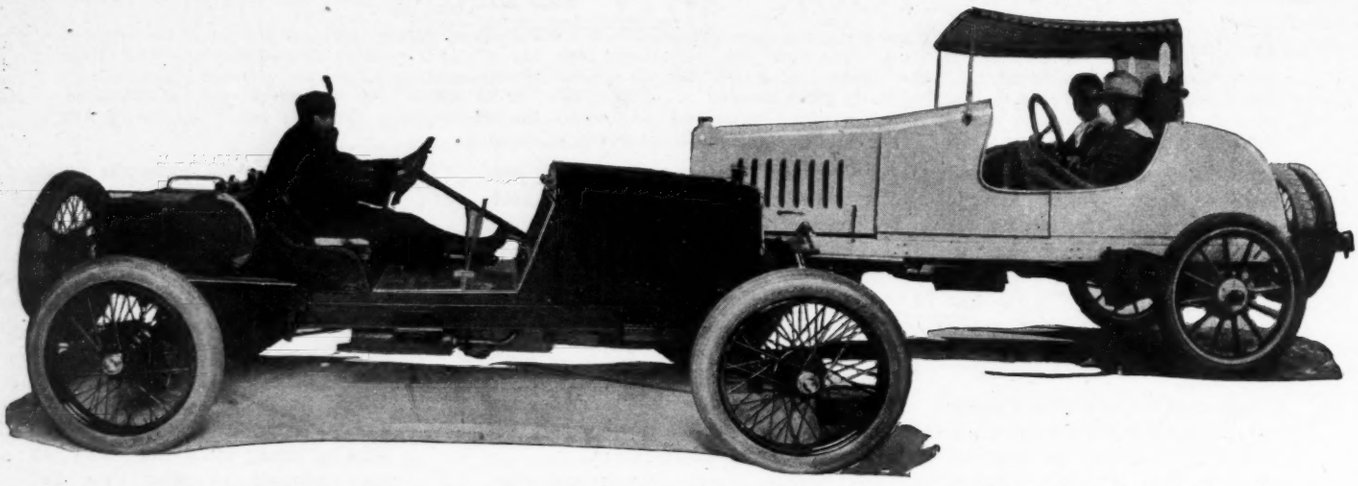


Fig. 1—These photographs are of Saxon roadsters which have been converted into racers with speedy-looking bodies

SAXON ROADSTERS INTO RACERS

Sketch and Two Photographs of Speedy-Looking Bodies

Waukon, Iowa—Editor MOTOR AGE—Publish a sketch of a Saxon four as a speedster.

2—Where would the gasoline tank be put and what kind of feed would be used?

3—Would aluminum pistons increase the speed materially and where can they be procured?

4—Would wire wheels and core tires increase speed or are cord tires made in this size?

5—Would MOTOR AGE advise changing type of radiator?

6—Is there any other means of increasing speed?

7—What gage steel should be used in the body?

8—Would ether ruin a motor if used steadily for two years?

9—Would enlarging the valves be of any advantage?

10—This car has electric lighting and starting. Would MOTOR AGE advise changing this?—Ralph Lee.

1—We have illustrated two Saxon fours with speedster bodies in Fig. 1. We consider both of these body types very suitable for a car of such small size. Another is shown in Fig. 4.

2—Preferably on the rear. Either pressure feed or a vacuum tank under the hood.

3—Yes, if properly installed. You can find names of makers in the advertising of this issue.

4—Wire wheels would assist to increase the speed although you could not expect a strikingly noticeable difference. Cord tires are not made this small, as far as we know.

5—The present radiator is thoroughly capable of taking care of the cooling. A new one would be for the sake of appearance only and that is for your decision, not ours.

6—The valves could be enlarged and higher gears fitted if you wished to go to this expense.

7—It could be as light as 22-gage.

8—We would not advise its use.

9—Yes.

10—No. Why do you think it should be changed?

Converting Old Top

Fort Smith, Ark.—Editor MOTOR AGE—How can one change an ordinary top to a one-man top without injuring the appearance of the top and be able to put it on again.

2—What is the correct wiring for a charging output operating on alternating current or direct current so that one may charge storage battery?—J. P. Elenby.

1—Only the covering of the top could be used. One would have to install an entirely new set of bows.

2—This we could not tell you until we knew the make and type of outfit.

Cadillac as a Speedster

Elizabethtown, Ky.—Editor MOTOR AGE—Illustrate the type 53 Cadillac built into a speedster type.

2—What firm could change the regular body—Stephen Hayward.

1—A sketch of a speedster body on a Cadillac model 53 is shown in Fig. 2. This is a low, four-passenger job with individual windshields of round, rimless glass set at an angle. There is only one door and a passage between the front seats. The tonneau has a flat deck, forming a square corner with the body side. This deck is wide behind the front seat and tapers off to the rear to give room for the tonneau seats. Under the deck are carrying compartments. If the rear seats are not desired a good effect could be had by sloping off the rear as shown by the dotted line, and carrying spare tires on top with a gasoline tank concealed underneath.

2—It would be quite out of the question to change the regular body into a speedster type.

DATA CONCERNING KISSELKAR 4-40

Bore and Stroke, Horsepower Rating and Gear Ratios

U. S. S. Milwaukee, Vallejo, Cal.—Editor MOTOR AGE—What is the make of motor used in the 1913 Kisselkar 4-40, its bore, stroke and N. A. C. C. rating, also gear ratios for different speeds?

2—The timing gear chains on this model are noisy. Is there any way of taking up slack in same?

3—The motor will not start on Mea magneto but will idle and runs full speed all right.—W. A. Mason.

1—This is a Kissel-built motor. Bore 4½ in., stroke 5¼ in., N. A. C. C. rating 32.44.

The differential gear ratio is 56:14 or 4:1.

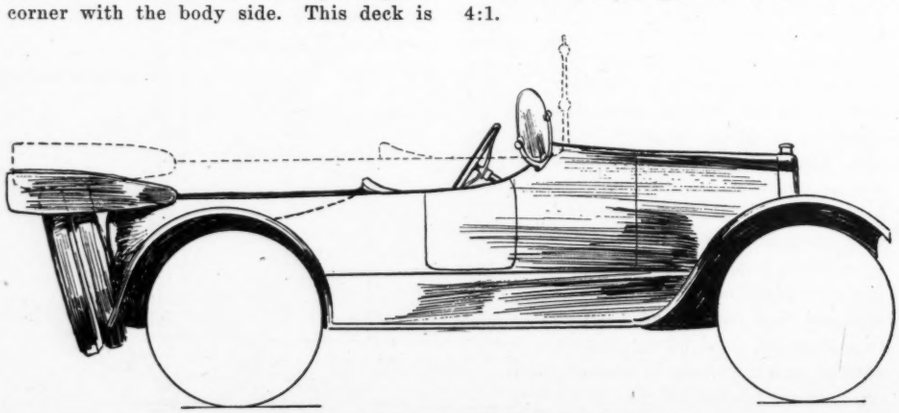


Fig. 2—Remodelled Cadillac built into a speedster type

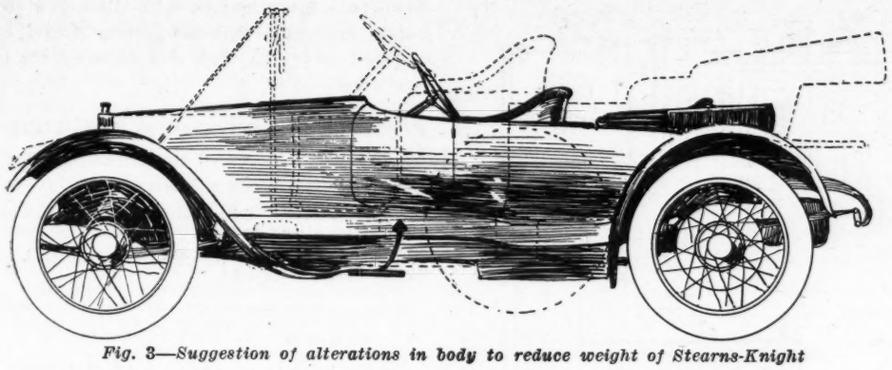


Fig. 3—Suggestion of alterations in body to reduce weight of Stearns-Knight

Transmission ratios—

On 4th	.847:1	On ton.	3.22 :1
On dir.	1 :1	On rev.	4.52 :1
On 2nd	1.757:1		

Total reduction between engine and rear axle—

On 4th	3.388:1	On ton.	12.88 :1
On dir.	4 :1	On rev.	18.08 :1
On 2nd	7.028:1		

2—Have a new set of timing gears put on.

3—Probably the magnets of the magneto need remagntizing.

SOME JOB TO NARROW FORD TREAD

Specification of Royal Tourist—Last Built in 1912

Glenwood, Ind.—Editor MOTOR AGE—Can a Ford front and rear axle be narrowed to 48 in. tread? If so, what companies do such work, and what would be the expense?

2—Where is the Aland Motor Car Co. located?

3—What is the bore and stroke of the Royal Tourist car?

4—By whom was this car manufactured and where located, and when did the company stop manufacturing?

5—What is the highest engine speed of a stock Ford motor?

6—What is the record tire change on racing cars, who made it, and where?—Harold E. Chaney.

1—It is our opinion that entirely new axles would have to be constructed to reduce the tread. Possibly the stock axles could be cut down but we have never seen it done, nor do we know of anybody in a position to do such work.

2—Detroit, Mich.

3-4—The bore and stroke of the 1912 model, which was the last built, was 5½ by 6. This was manufactured by the Royal Tourist Car Co., Cleveland, Ohio, which company was dissolved in 1912.

5—Around 2000 r.p.m.

6—There is no official record tire change recognized by the American Automobile Association. However, the quickest time announced during a sanctioned race is 13 sec., and if our memory serves us correctly it was made by the late Bob Burman.

Lightening Stearns-Knight

Mount Joy, Pa.—I have a 1912 Stearns-Knight, four-cylinder, that weighs 4350 lb. What could be done to make this car lighter?

2—What would be the difference in weight were I to use wire wheels instead of the present wheels with rims?

3—Could this machine be made lighter by fitting a new body with one-man top?

4—Could MOTOR AGE give me an idea as to how this machine would appear with a cloverleaf or roadster body? Tires are carried on the rear.—P. Frank Schock.

1—About the only alterations which could be made to reduce weight would be to install a new body and possibly fit wire wheels.

2—Probably around 100 lb.

3—Yes.

4—See illustration in Fig. 3.

COUNTERBALANCED CRANKSHAFTS

Not Enough Room to Add Counterweights to Ford Shaft

Seattle, Wash.—Editor MOTOR AGE—I am building a Ford speedster and would like the following information in regard to it:

1—What firms make counterbalanced crankshafts?

2—Is it possible to counterbalance a standard Ford crankshaft satisfactorily?

3—Would MOTOR AGE advise taking about ⅛ inch off the cylinder cap yet not injure the bearings or heat the motor?

4—I can get steel pistons the same weight as aluminum pistons. Which would MOTOR AGE recommend? I believe steel pistons would be better in a Ford.

5—How large is it possible to ream a Ford valve seat? Will it stand ⅛ inch? What is the size of the standard Ford valve. I have been told a Packard 18 valve can be used for this purpose.

6—Is there a better piston ring than a one-piece lap ring?

7—Who makes tungsten valves, and will the concern make a set of valves to order?

8—Does MOTOR AGE know of any one who makes a detachable head for a Ford with overhead valves? Kindly illustrate such a head. Here is my idea for such: The cap should not allow any gas to come through its regular passage, a gasket being used to keep that part closed. Take out the old valves, use old valve guides for pushrod guides, make small holes through the cap for the pushrods to go through to the rocker arms with two valves, say about 1⅜ in. A metal cover could be placed over this, if desired, to keep out the dust. I do not believe it would be any more trouble to install this than it would be to take a regular cap off to clean carbon. One could also use the regular camshaft where there are overhead camshafts. It seems to me this is the dope for racing. A sixteen-valve could be arranged the same way. Large valves help any motor power and speed.—R. Lichtenberger.

1—MOTOR AGE has no record of a concern manufacturing counterbalanced crankshafts for Ford engines.

2—There is not enough surplus room in the Ford crankcase to enable you to attach balancing weights to the crankshaft.

3—MOTOR AGE has never advised planing down the cylinder head to increase compression.

4—Steel pistons have never been used extensively because of their hardness in comparison with the cast-iron cylinders in which they work.

5—Not more than $\frac{3}{16}$ in. The size of the standard Ford valve is 1¼ in.

6—So many are the types of good piston rings on the market that it is impossible to designate one particular kind.

7—Rich Tool Co., Railway Exchange Bldg., Chicago. This company will handle special orders.

8—Robert M. Roof, Anderson, Ind., and D. R. Noonas, Paris, Ill., manufacture overhead-valve attachments for Ford engines. The Roof attachment was illustrated in the Jan. 25 issue of MOTOR AGE, page 98. Neither of these exactly follow the idea you have.

Velie Ignition Timing

Sylvania, Ga.—Editor MOTOR AGE—I have a 1914 series 9, four-cylinder Velie car with four-passenger or baby-tonneau body. What is the gear ratio of this car in second, third and fourth speed?

2—What is the correct method of setting the ignition on this engine? It is set now so that the spark occurs when the piston is about $\frac{1}{16}$-in. down before dead center, and it knocks with retarded spark on a pull. The motor is not carbonized.—G. H. Hilton.

1—The gear ratios are as follows:

First: 3.2 to 1.

Second: 1.68 to 1.

Third: 1 to 1.

Fourth: .792 to 1.

The rear-axle gear ratio is 3 13/14 to 1.

2—The magneto should be set so that the spark occurs 1¼ in. late on the flywheel. Yours is evidently set too early.

Alterations for Speed

Shubert, Neb.—Editor MOTOR AGE—I would like instructions for rebuilding a Maxwell 25, 1915 model, into a racing car, to be used on ½-mile tracks.

2—What gear ratio should be used? Where can these gears be purchased?

3—What tread would be best to use on such tracks?

4—Also, how much larger valves might be used and be safe under explosions?—R. H. Bailey.

1 — The following alterations can be made to a car to increase its speed: Enlarge the valves, install a racing carbureter, install aluminum pistons and nonleaking rings, lap the cylinders, use higher gearing, use smooth or corrugated tread tires, reduce the body weight as much as possible by stripping, lower the seats as

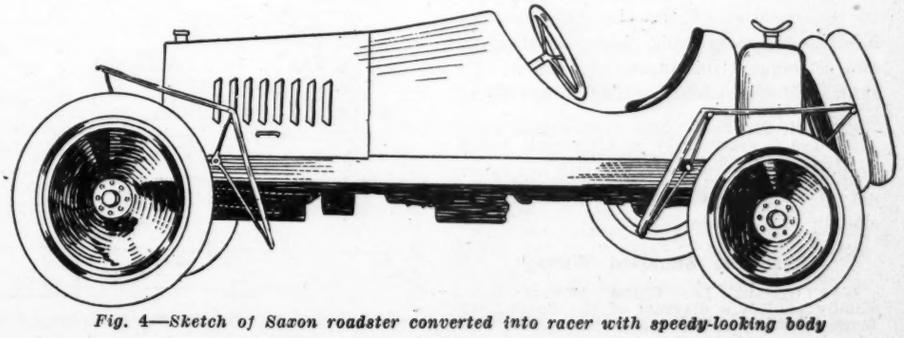


Fig. 4—Sketch of Saxon roadster converted into racer with speedy-looking body

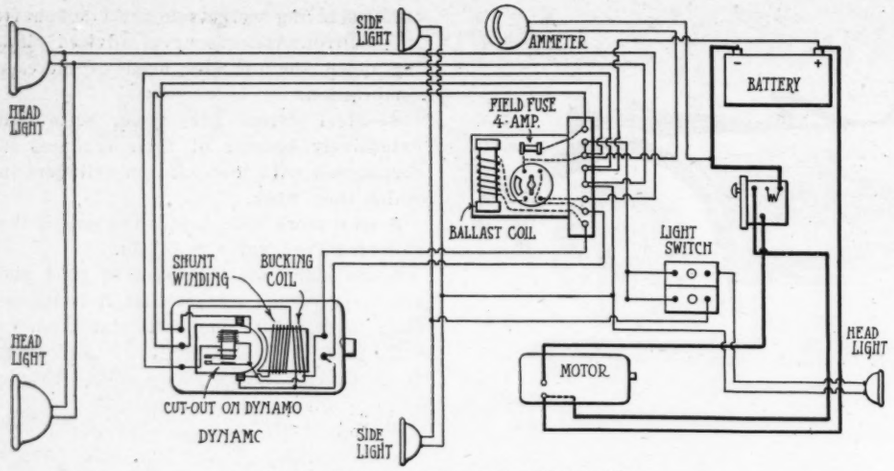


Fig. 5—Rushmore standard wiring system

much as possible, remove the fan if the engine will cool without boiling out the water, etc., etc.

2—Not less than 3 to 1 for ½-mile tracks. We know of no one who carries them in stock, unless it might be the car makers.

3—The standard tread.

4—The valves could be increased ⅛ in.

MEANING OF CYCLE IN ENGINES

Cycle Is Event of Piston Traveling Length of Stroke

Chicago—Editor MOTOR AGE—Make clear the meaning of four-cycle. Is a stroke 180 deg. a cycle or is the complete operation 320 deg. a cycle, or four strokes to complete the cycle?

2—Could one induct a secondary current without the use of a breaker or vibrator or without breaking the primary current?

3—Is there such an occurrence as compression being so great that it will not allow the spark to occur or make the spark out.—M. F. Herbert.

1—A cycle is generally in a series of events occurring in succession which goes to make up a complete operation. Some engines take more strokes to complete their cycles than do others. By far the greatest proportion in motor car practice require four strokes of the piston between explosions; that is, the piston travels up twice and down twice, making two revolutions of the crankshaft between explosions. These have come to be called four-cycle engines. There are others which take only two strokes, one up and one down; that is, one revolution of the crankshaft to complete the cycle. These are called two-cycle engines.

2—Yes. A secondary current is induced whenever the primary current changes in strength or direction and is proportional to the rapidity of the change. A quick break is the most rapid change in strength and consequently induces the greatest current in the secondary, other things being equal.

3—Yes. Frequently a plug will spark properly in the open air, but will not spark across the higher resistance of compression in the cylinder.

Rushmore Standard Wiring

New Orleans, La.—Editor MOTOR AGE—Kindly publish a diagram of the Bosch-Rushmore starting and lighting system on the 1911 Locomobile; also the internal connections of the Rushmore dynamo used in this outfit.—Oswald Luhrey.

The Rushmore standard wiring is illustrated in Fig. 5. It is assumed that this is the system referred to.

Saxon and Cadillac Wiring

Ocilla, Ga.—Editor MOTOR AGE—Kindly publish a diagram of a Gray & Davis starter and generator which is used on the model S-2-T Saxon touring car, 1915 model.

2—Also, please publish a wiring diagram of the 1917 Cadillac, model 55.—S. E. Simpson.

1—Shown in Fig. 7.

2—Shown in Fig. 6.

Why Use of 12-Volt

Madison, S. D.—Editor MOTOR AGE—Where can I tap a Hudson Super-six to install an auxiliary air valve? The intake manifold is cast with the cylinder block.

2—In case my storage battery went wrong, where would I connect up emergency dry cells? What should be done to the generator in such a case?

3—Why does the new Harroun car use a 12-volt storage battery when it has a two-unit electric system? My observation has been that a 6-volt battery is just as efficient as a 12-volt and is certainly less trouble to take care of and is cheaper to replace if necessary.—H. H. Frudenfeld, M. D.

1—In the center of the block and into the manifold at a point about 1 in. above the carbureter intake.

2—Emergency dry cells could be connected to the storage battery terminals. The generator should be completely disconnected and the circuit closed up as if it did not exist.

3—This seems to be a matter of varying opinion. Some engineers prefer the 6-volt system, some the 12. We do not believe that investigation will allow you to retain your idea that the system with the higher voltage is more troublesome than the other.

FITTING PISTON RINGS ON FORD

Inquiries Are Referred to Article in This Week's Issue

Yonkers, N. Y.—Editor MOTOR AGE—Explain method of fitting new piston rings on a Ford motor.

2—Can the piston be fitted without taking the cylinder block off?

3—How are the main bearings tightened?

4—Is it possible to replace the lower fan belt pulley without taking down the motor?—Ed McKeever.

1—See article on page 34 of this issue.

2—No.

3—After the engine has been taken out of the car remove the crankcase, gearset cover, cylinder head, pistons, connecting rods, gearset, and magneto coils. Take off the three babbitted caps and clean the bearing surfaces with gasoline. Apply Persian blue or red lead to the crankshaft-bearing surfaces, which will enable you, in fitting the caps, to determine whether a perfect bearing surface is obtained.

Place the rear cap in position and tighten it up as much as possible without stripping the bolt threads. When the main bearing has been properly fitted, the crankshaft will permit moving with one hand. If the crankshaft cannot be turned with one hand, the contact between the bearing surfaces is evidently too close, and the cap requires shimming up, one or two brass liners usually being sufficient.

In case the crankshaft moves too easily with one hand, the shims should be removed and the steel surface of the cap filed off, permitting it to set closer.

After removing the cap, observe whether the blue or red painting indicate a full bearing the length of the cap. If the painting does not show a true bearing, the babbitt should be scraped and the cap refitted until the proper results are obtained.

Lay the rear cap aside and proceed to adjust the center bearing in the same manner. Repeat the operation with the front bearing, with the other two bearings laid aside.

When the proper adjustment of each bearing has been obtained, clean the babbitt surface carefully and place a little

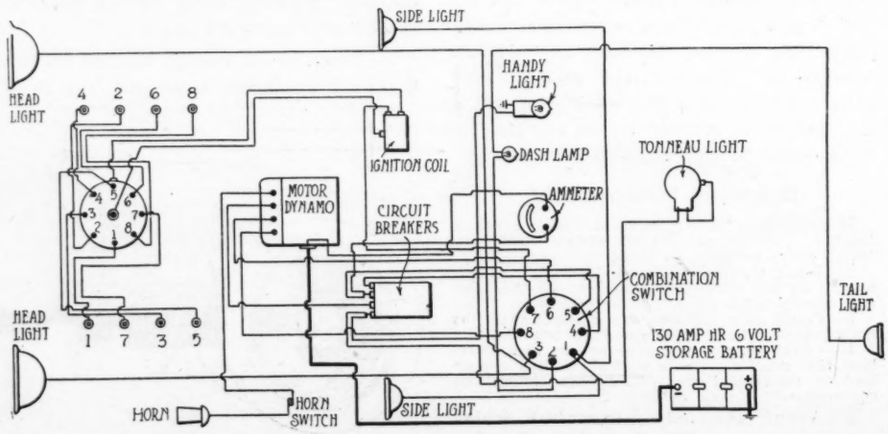


Fig. 6—Wiring diagram of 1917 Cadillac

lubricating oil on the bearings, also on the crankshaft; then draw the caps up as close as possible—the necessary shims, of course, being in place. Do not be afraid of getting the cap bolts too tight, as the shim under the cap and the oil between the bearing surfaces will prevent the metal being drawn into too close contact. If oil is not put on the bearing surfaces, the babbitt is apt to cut out when the engine is started, before the oil in the crankcase can reach the bearings.

In replacing the crankcase and gearset cover it is advisable to use a new set of felt gaskets to prevent oil leaks.

Cleveland, O.—Editor MOTOR AGE—Explain methods of underslinging a Ford.
2—Could the stroke of a Ford be enlarged, and if so, how and how much? How much could the bore be enlarged?
3—Do the Goodrich people market a 32 by 4 Silvertown cord tire?
4—What company makes the radiator used on the Peugeot racing cars?
5—Is 2¾ to 1 the highest gearing that could be used on a Ford for track work?—J. E. Kelly.

1-2—See the article on page 34 of this issue.

3—No.

4—These are made in France. The name of the maker is not known to us.

5—See answer No. 1.

DeKalb, Ill.—Editor MOTOR AGE—How can the chassis and frame of a Ford car be lowered in converting it into a speedster?—J. F. Quinn.

See article on page 34 of this issue.

Omaha, Neb.—Editor MOTOR AGE—Give the names and addresses of concerns specializing in parts to be used in underslinging a Ford car.
2—We would appreciate any suggestions or drawings covering changes such as we desire to make, namely bringing the car closer to the ground by lowering the springs, axles, etc.—A. B. Zwiebel.

1—To our knowledge there is no one at present making parts specially for underslinging a Ford car.

2—See the article on page 34 of this issue.

Saxon Into Speedster

Hobart, Okla.—Editor MOTOR AGE—Publish a diagram showing how to convert a 1916 Saxon into a speedster.
2—State where parts may be secured for this work.—L. E. Duncanson.

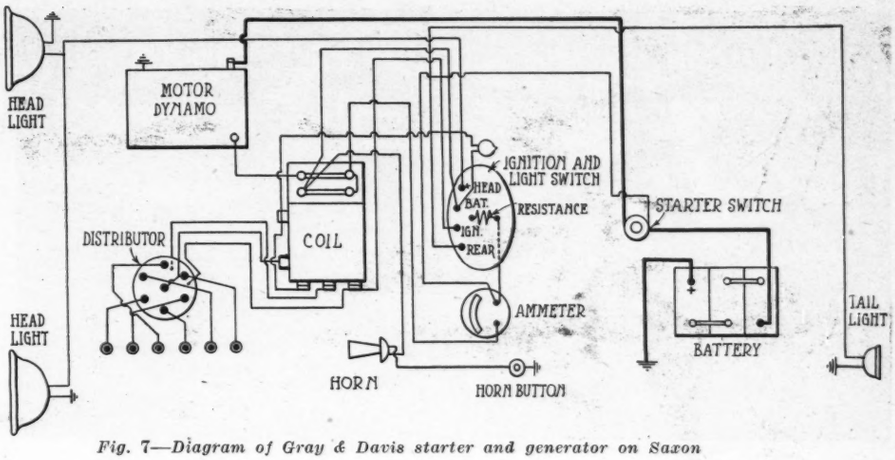


Fig. 7—Diagram of Gray & Davis starter and generator on Saxon

1—Two body types are shown in Fig. 1, another in Fig. 4.

2—Special bodies for this model are manufactured by Charles Schutte, Pennsylvania Auto Co., Lancaster, Pa.

Worm and Bevel Drive

Peoria, Ill.—Editor MOTOR AGE—Is there any more friction in a worm drive than a bevel gear, or any other drive? If there is, is it as long, and has it as much power as other drives?—S. Weinstein.

The worm drive, in practice, has no more friction than other types. The contact surface is greater than the ordinary bevel drive and consequently the wearing qualities are good. There is no greater power loss, and probably even less.

Michigan Wiring Diagram

Ottawa, Kans.—Editor MOTOR AGE—Is the Jones Electric Starter Co. still located in Chicago?
2—Furnish me with a diagram of the electrical system used on the Michigan 40, the last model they built.—A. Lee Gray.

1—Yes, as Roth Bros.

2—Illustrated in Fig. 8.

Warren Engine Vibrates

Weston, Ill.—Editor MOTOR AGE—I have a 1913 Warren car which runs well up to 20 m.p.h.; above that it vibrates, and at 35 m.p.h. it is hard to hold the steering wheel. I also have trouble in keeping the lower ends of the connecting rods tight. If this engine is out of balance what can be done to remedy it? Would light pistons help any?—John F. Schneider.

It would be our supposition that the engine is more out of line than out of balance. This impression comes from the fact that you have trouble keeping the connecting rods tight. An experienced garageman, having at hand equipment for lining up an engine, could very likely find the fault if it was there. If the trouble is really in the balance of the engine light pistons would have their effect in smoothing out the action, although the improper balance might not come from the pistons at all.

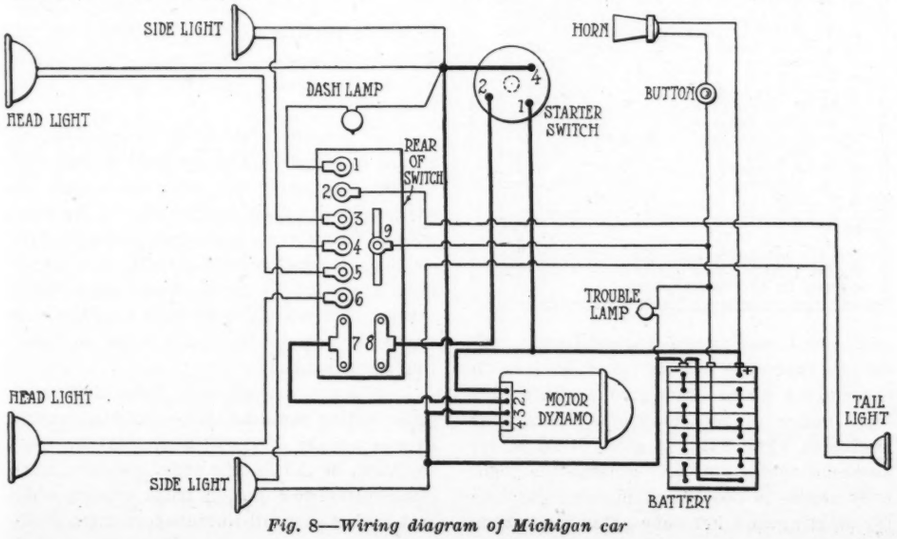


Fig. 8—Wiring diagram of Michigan car

BORE AND STROKE OF JAY-EYE-SEE

No Production of Cars Using Kerosene as Fuel

Gridley, Ill.—Editor MOTOR AGE—What is the S. A. E. rating of the 1915 Case, the 1914 Inter-State 6-45, and the Buick small and large sixes?
2—What are the advantages of the eight and twelve cylinders?
3—Give the names of cars using kerosene for fuel.
4—State the bore and stroke of Disbrow's Jay-Eye-See.—A Reader.

1—The Case was made in three models in 1915. The N. A. C. C. ratings of the models are: Model 25, 22.5; model 35, 29; model 40, 32.4. The Inter-State 6-45 has an N. A. C. C. rating of 38.4. The small Buick six has a rating of 27.4 and the large six, 1915 model, 33.7.

2—To give a more even flow of power than is possible with engines of a less number of cylinders. In other words, there are more power impulses per revolution of the crankshaft, thus reducing or eliminating the period when there will be no power delivered to the crankshaft. This tends toward freedom from vibration and engine flexibility.

3—At the present time there are no cars manufactured in quantities that use kerosene as a standard fuel.

4—The engine of the Jay-Eye-See has a bore of 9¾ in. and a stroke of 8⅝ in.

THICKNESS OF GENERATOR BRUSH

Third Brush May Stick Because of Accumulation of Oil

Malmo, Nebr.—Editor MOTOR AGE—What size of brush is used on a Delco generator in a 1916 Buick 45?
2—What causes the generator to stick so that it has to be cranked?—J. Edward Jackson.

1—The main generator brushes are ⅜ in.

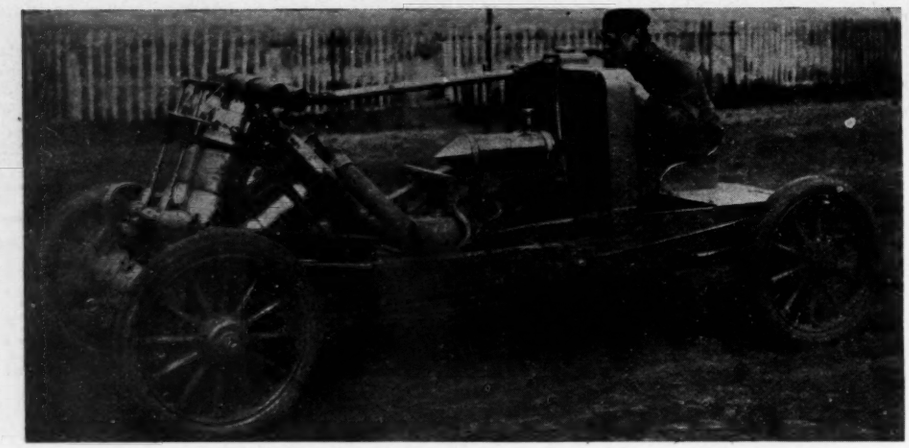


Fig. 9—Photograph of the Christie car

thick and ½ in. wide and approximately 1 in. long. The third brush is $\frac{5}{16}$ in. thick, $\frac{7}{16}$ in. wide and 1⅛ in. long. Brush material of either higher or lower resistance than the regular brushes on these generators will cause serious trouble.

2—An accumulation of oil causes the sticking on the third brush and on the commutator. This oil gums up on the brush and on the commutator and, especially when the motor generator is cold, interposes a fairly high resistance between the brush and the commutator, sometimes insulating it completely. Under these conditions it is difficult, or impossible, to get an armature to revolve, so that the gears can be meshed until the generator has heated up sufficiently to remove this oil film between the third brush and the commutator.

OLDFIELD'S FRONT-DRIVE CHRISTIE

Description of Transmission Units Between Engine and Wheels

East Orange, N. J.—Editor MOTOR AGE—I would like to know the records held by Oldfield's Christie car and any information regarding the front drive would be of interest to me. If you have a photograph of the car will you print it?—Edward C. Rothard.

Complete records held by this car are forthcoming and will be published at an early date. In this car the motor constitutes the central portion of the axle and is direct connected to the wheels through cone clutches. The knuckle is placed very close to the central plane of the wheel, almost inside of the wheel, and since the axle must transmit the engine power, the knuckle is made with a universal, the center of this being the center of rotation of the knuckle. This knuckle can rotate about its own center, and when driven by the engine, the rotation being in a horizontal plane. It can also rotate partly about a vertical plane, this being the motion given to it in steering a car around a curve. Even when the wheels are turned at an angle, as in rounding a curve, the power is still applied through the universal.

In addition to all this the wheels must rise and fall with road inequalities, while the frame carrying the axle must remain stationary. To care for this difference in level, the driving shaft is made with a second universal which is closer to the engine. This permits the wheel to be above the crankshaft level or below it, or even inclined to it, and still have the power applied in the same manner.

An illustration of the car is shown in Fig. 9.

KEROSENE FUEL RESEARCH WORK

Great Deal Being Done to Perfect Suitable Carbureter

Detroit, Mich.—Editor MOTOR AGE—What progress has been made by inventors in the way of kerosene carbureters? What are the greatest obstacles encountered and the probability of overcoming them?—C. J. Marsh.

1—There is a great deal of research work being done along this line by individuals and small and large corporations. Although there are a number of devices on the market which have given satisfactory tests under severe conditions, motor car engineers have not yet seen fit to adopt kerosene equipment. At present the tendency seems to be toward burning gasoline for starting and kerosene after the engine is warmed. It is to be expected that in a short time we will have a satisfactory method adopted by a good many car makers to burn kerosene. The greatest obstacle encountered is to vaporize the fuel. Kerosene is less volatile than gasoline. In other words it does not vaporize as readily. Vaporization must be brought about by the application of heat and it is readily seen that the less volatile fluid must have more heat for vaporization. If you are a driver you know that your engine, burning gasoline, is reluctant to start when cold, and on zero mornings you may have to go to considerable trouble to get things heated up before your motor will start at all. With kerosene it is even more difficult.

Inquiries Answered and Communications Received

Ralph Lee.....Waukon, Iowa
J. P. Elenby.....Fort Smith, Ark.
Stephen Hayward...Elizabethtown, Ky.
W. A. Mason.....Vallejo, Cal.
Harold E. Chaney.....Glenwood, Ind.
P. Frank Schock.....Mount Joy, Pa.
R. Lichtenberger.....Seattle, Wash.
C. H. Hilton.....Sylvania, Ga.
R. H. Bailey.....Shubert, Neb.
M. F. Herbert.....Chicago
S. E. Simpson.....Ocilla, Ga.
Oswald Luhrey.....New Orleans, La.
H. H. Frudenfeld.....Madison, S. D.
Ed McKeever.....Yonkers, N. Y.
J. E. Kelly.....Cleveland, Ohio
J. E. Quinn.....DeKalb, Ill.
A. B. Zwiebel.....Omaha, Neb.
L. E. Duncanson.....Hobart, Okla.
S. Weinstein.....Peoria, Ill.
A Reader.....Gridley, Ill.
A. Lee Gray.....Ottawa, Kan.
John F. Schneider.....Weston, Ill.
J. Edward Jackson.....Malmo, Neb.
Edward C. Rothard...East Orange, N. J.
C. J. Marsh.....Detroit
S. Ross Parker.....Seattle, Wash.
C. A. Lamkin.....Buckholts, Tex.
A. C. Hobart.....Washington, D. C.
J. S. Pittman.....Lake Providence, La.
F. G. S.....Oshkosh, Wis.

No communications not signed by the writer's name and address will be answered in this department.

THINKS CYCLECAR WASN'T IN VAIN

Writer Sees Good Aid in Teaching Lightweight Value

Seattle, Wash. — Editor MOTOR AGE — The cyclecar movement with all its rampant, short-lived enthusiasm was not in vain. It aided in teaching that light weight is a great diseratum in a motor car. Light weight necessitates better quality, which is another great need of American motor vehicles.

There is a large field for a delivery car on cyclecar lines, if sturdily built and selling at a right price.

Let it be something like this: Engine, two-cylinder opposed, 3½-in. bore, 3¾-in. stroke, water cooled, or a four-cylinder of equivalent horsepower, the four to be preferred if cost would not far exceed that of the two-cylinder. Tread should be 36 or 38 in., but not any tread between 38 and 56, for reasons most ostensible to anyone acquainted with country roads. The standard tread would necessitate more horsepower and add to cost of construction. The 38-in. tread is practical.

Would Have Frame Wood

The frame should be of wood and all springs cantilever, as cantilever springs need not be at all expensive. The body would, of course, be of wood, and for good economical construction the rear or load-carrying portion of the body could be of buck-board slats. Then each owner could add to the size of carrying space if he so desired.

Wire wheels with tires 26 by 2½ in. would be ample. The car should seat one person and carry an additional load of about 400 lb. The gearset should be two-speed sliding gear, geared exceedingly low on the low speed, about 15 to 1, as a maximum speed of 18 m.p.h. would give satisfaction, the main use of such a utility car being the supplanting of a horse in hauling light loads.

A delivery car of such dimensions and construction could be sold by the thousands in every state of the Union, I think. For instance, in the Pacific coast states numerous poultry and garden truck raisers need just such a carryall to transport their prod-

ucts to market and carry back supplies. With oats wholesaling at $1.50 the hundred pounds and hay at $25 the ton, gasoline at the highest price is dirt cheap when used on a light delivery car which does the work of a horse, and a very light motor vehicle could do just that.

This delivery wagon should be sturdily built, weight about 500 lbs. and sell under $200.

What factory will now begin to supply the demand? If satisfied with a reasonable profit, the manufacturer could grow with a constantly increasing profit through the coming decades.—S. Ross Parker.

FORD WIRE WHEELS ON HUPP 20

Can Be Interchanged in Front But Not in Rear

Buckholts, Tex.—Editor MOTOR AGE—Is it possible to use Ford wire wheels on a 1912 Hupmobile 20, and if so, how could it be done? 2—What is the correct method of timing a camshaft and magneto, the latter being a set spark?—C. A. Lamkin.

1—It is quite possible to use the front wheels of the Ford car on the front axles of the 1912 Hupmobile model 20. There is, however, a difference in the Ford rear axles and those of the Hupmobile, and in order to use these it would be necessary to have new inner hubs. The Houk people are not in a position to do the machine work on these at the present time, but could furnish you with the castings for the two rear inner hubs and the machining would be a very simple operation.

2—We cannot give you the camshaft setting without knowing the make of car to which it applies. Magneto settings follow a fixed rule. Place the piston in No. 1 cylinder at top center. Set the breaker points in the magneto so that the points for No. 1 cylinder will be just ready to break. To make this setting the spark should be set at full retard.

SPECIFICATIONS OF PEUGEOT CAR

Cannot Estimate Speed of Stripped-Down Studebaker

Lake Providence, La.—Editor MOTOR AGE—What is the horsepower, wheelbase, piston size and weight of Resta's and Aitken's Peugeot? Also give the cost and highest speed these cars have attained. 2—What speed could a Studebaker 6-16 car maintain on a track, stripped with a racing axle ratio? 3—What is the gear ratio of the Peugeot cars? 4—Where could I obtain wire wheels for a Studebaker 6-16 model? 5—What is the best track speed of the Packard Twin Six?—J. S. Pittman.

The N. A. C. C. horsepower rating is 20.9. Brake horsepower is somewhere around the 100 mark. The wheelbase is 106 in. the piston diameter 3.62 in. and the bore 6.65 in. This gives a piston displacement of 274 cu. in. There is no available record of the cost. Both cars have attained speeds around 115 m.p.h.

2—There is no means of estimating, because it depends on such a multitude of things.

3—3.1 to 1.

4—Any wire wheel maker can furnish them.

5—In the official trial on the Chicago speedway in July, 1915, a speed of 72.6 m.p.h. was attained. This was a strictly stock car.

Safety First Suggestion

Oshkosh, Wis.—Editor MOTOR AGE—A suggestion from a subscriber for Safety at country railroad crossings:

Put up a sign about 3 ft. by 5 ft., 400 ft. from each crossing, thus,

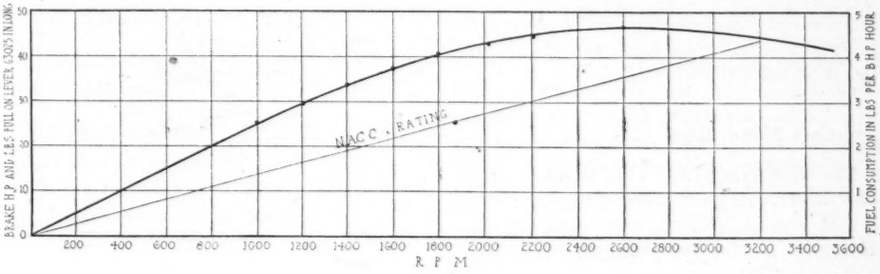
> STOP
> Railroad Crossing
> 400 ft.

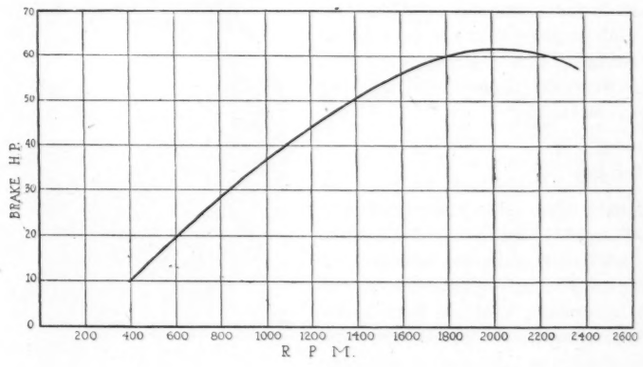
Have the word stop in large red letters, the other letters in black and the sign board white. This sign could be seen 1000 ft. from the crossing and the car could be brought under control. The expense of erecting these could be divided 50-50 between the railroads and state.—F. G. S.

Power Curves and Data

Washington, D. C.—Editor MOTOR AGE—Kindly publish the horsepower curves and standard high gear ratios of the following makes of cars: Chalmers 30, Moon 66, Jeffery Six, Hudson Super Six, Mitchell Six, Buick Six and Cadillac Eight. If the curves are not available kindly give the maximum horsepowers with the corresponding r.p.m.—A. C. Hobart.

The horsepower curves available are published in the group in Fig. 10. The maximum horsepower of the 3½ by 5 six-cylinder Mitchell engine is 55 and the corresponding r.p.m. is 950. The standard high-gear ratio is 4 5/12 to 1. The Buick engine is said by the factory to be capable of developing 45 to 48 hp. at 2200 r.p.m. The standard gear ratio is 4.08 to 1 with 34-in. wheels. The Hudson engines pull a maximum of about 4 hp. at about 2000 r.p.m. The standard gear ratio on the Moon model 6-66 is 4 5/12 to 1; on the Jeffery, 4½ to 1. The rear-axle ratio on the five-passenger Chalmers 6-30 is 4:75 to 1, on the seven-passenger, 5.18 to 1.





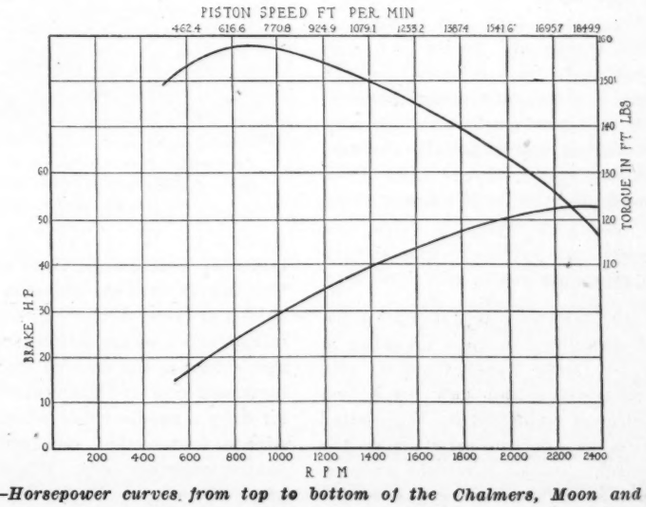
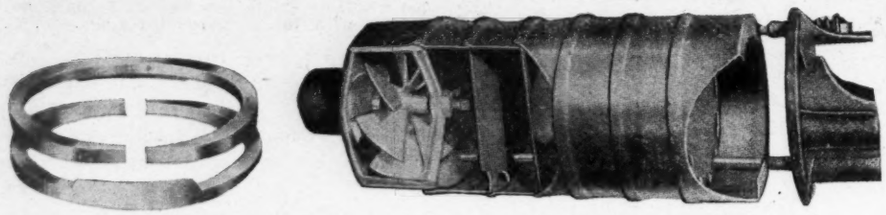


Fig. 10—Horsepower curves from top to bottom of the Chalmers, Moon and Jeffery

The Accessory Corner



A piston ring without joints and an automatic exhaust muffler

Mutty Puts Out a Fabric

THE L. J. Mutty Co. of Boston, Mass., announces that it has a new fabric for motor car tops. This company is one of the pioneers in the manufacture of rubberized cloths. The new product is called DrydeK. This product is manufactured as DrydeK rubber and as DrydeK leather. It is a four-ply composition. It is very soft, pliable and easy to work and it is said to be permanently waterproof.

Jointless Piston Ring

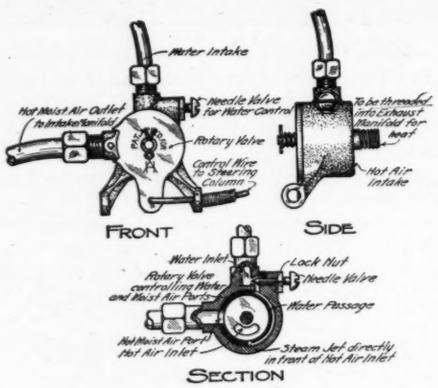
The Jointless piston ring is made up of two pieces which when fitted together form a seal over each of the split ends. A considerable amount of expansion and contraction is allowed without there being a possibility of leakage through the joints. Furthermore it has a uniform expansion on all sides which means equal pressure on all points of contact with the cylinder wall. The price is $1 each. Detroit Piston Ring Co., Detroit, Mich.

Vapor Motor Gas

Vapor Motor Gas is a compound prepared under a secret formula which when added to gasoline is said to increase the effieiency from 20 to 50 per cent on the gallon. It is claimed that all ingredients used in the preparation of this compound are of such a nature that they will begin to soften and break up carbon deposits and keep the motor clean. In motor cars of all makes, trucks, etc., under 25 hp., ½ oz. of Vapor Motor Gas is used to 5 gal. of gasoline. It is not only claimed that it will reduce the gasoline bill and remove carbon but that it will materially increase the power and speed of the car. It is manufactured by Paul Mercier, Utica, N. Y.

Moisture Carbureter

A moisture carbureter to get more mileage out of gasoline has been invented in Denver by Dr. Oscar Hayes, formerly city health commissioner and now an acting assistant surgeon employed by the United States navy. It is connected with the water manifold, intake manifold and exhaust manifold in such a way as to get the most heat out of it to the carbureter. The water travels along a tiny groove, half way around the curved surface of a rotary valve where it meets the heated air and produces the desired moist air for the increased power. The water inlet is regulated by a needle valve which is connected with a foot control on Fords and a dash control on other cars. Water is turned on after the engine is started and must be shut off as soon as the engine is stopped. Tests have shown a saving of 20 to 40 per cent in gasoline so it is claimed. The moisture does not go through the regular carbureter but meets the gas mixture in the intake manifold, thus tending toward perfect combustion. The price is $10 and it is now being manufactured by Hayes-Ederholdt Mfg. Co., Denver, Colo.



Moisture carbureter designed to get more mileage out of gasoline

Pneumatic truck tires in cord construction, much larger and stronger than for passenger cars

Goodyear Pneumatic Truck Tires

Goodyear has just announced a single pneumatic cord truck tire which is the outgrowth of five years of experimentation. These tires are made at the present time in four sizes as follows: 36 by 6, 38 by 7, 40 by 8, and 42 by 9 and have an ideal load ranging from 2050 lbs. to 4650 lbs. These pneumatic truck tires are in cord construction and are built the same as cord tires for passenger cars but much larger and stronger with a greater number of plys and cords. They are made in the all-weather tread. The tubes for the truck tires are constructed by the laminated process, that is, thin sheets of pure gum are built up layer upon layer in a construction which prevents blisters and air holes. They are extra heavy and of a uniform gage. Goodyear Tire & Rubber Co., Acme, Ohio.

Gabriel Snubbers

In the January 25 issue of MOTOR AGE in the description of Gabriel snubbers, it was inferred that the straps used in the construction were made of rubber or leather. In reality this strap is woven fabric as neither rubber or leather could be used in a device of this kind with satisfactory results. This woven fabric belt is faced with a brass friction band and it is the action of the fabric belt on the brass band which really creates the resistance exerted by the snubber rather than the compression of the coil spring. Of course the entire resistance produced by the snubbers on the rebound of the car springs is a combination of the friction and the compression of the coil spring. They are made by the Gabriel Mfg. Co., Cleveland, Ohio.

Cook Fan Muffler

This automatic exhauster muffler is composed of a fan, a few baffle plates, a safety valve and the outer shell. The fan is driven by the force of the engine exhaust and it is mounted on self-lubricating ball bearings and will spin several minutes after the engine stops. The noise of the exhaust is said to be greatly reduced in passing through the fan. The fan action of

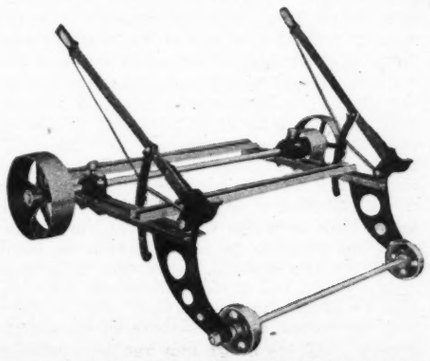
the exhaust impulses permits using baffle plates with unusually large openings, practically eliminating back pressure. The safety valve operates to relieve the muffler of the great pressure caused by back-fire explosions. When such an explosion takes place, the entire back end of the muffler is forced away from the main body and the gases escape through the large opening thus created. Three substantial springs immediately restore the end to its normal position. A fan operates to remove the burned gases and it is said that this feature permits of a leaner mixture inasmuch as the cylinders are thoroughly scavenged by the fan and vacuum. Cook Muffler Co., Chicago.

Hand-y Signal

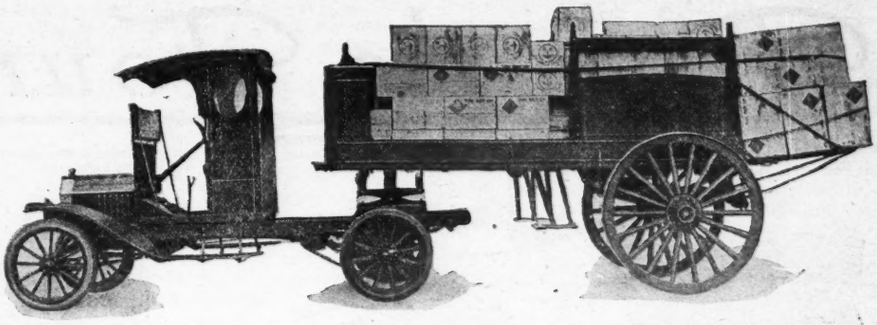
The Hand-y signal is a compact device which attaches to the driver's side of the car. It is claimed that you can put it on any make of car in 5 min. time. A light pressure upon a small lever instantly projects a large red signaling hand 16½ in. out from the box which holds it when in normal position. When the lever is released, the hand at once returns into its case. The signal for open cars operates with a lever on the side of the box and sells for $3. A closed car type operates by pulling a cord on the side of the body panel and sells complete for $3.30. The Hand-y Signal Co., New York.

Union Tractor Unit

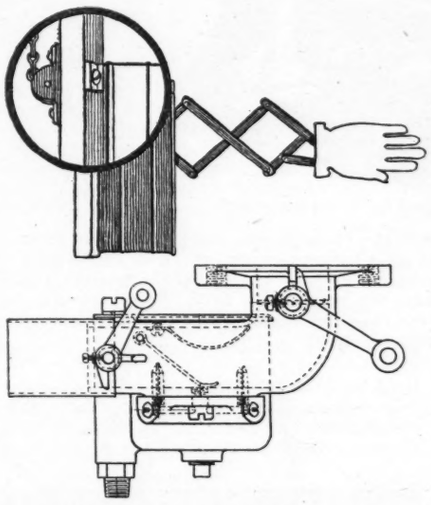
The Union 3-ton tractor unit can be riveted onto any Ford car and requires only about a half a day's work of one man. The drawing capacity of this tractor is guaranteed up to 6000 lb. The wheelbase is 110 in. and tread is standard 56 in. Because of this very short wheelbase and the fact that it carries its wagon on a turntable on the rear deck, the unit can be easily turned and backed up in very cramped spaces. Any number of after-wagons can be used in combination with one tractor. The after wagons can be loaded and unloaded and detached from the tractor, minimizing the expense of delay in tying up the use of the truck. Drive is by a heavy roller tractor-type chain and the gear ratio is 9 to 1, allowing the maximum speed of 12 m.p.h. Springs are semi-elliptic with an auxiliary over the rear axle. The tires used are Goodyear S. V. solid rubber 3½ in. Price of the complete equipment is $375. Union Truck Mfg. Co., Inc., New York.



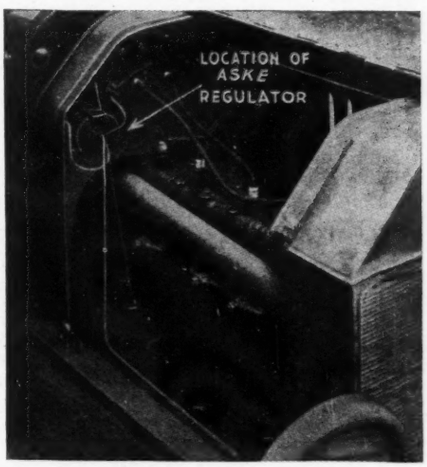
Jack and pulley unit for lifting cars to drive presses and so on



A 3-ton tractor unit that can be riveted to any Ford car in about half a day by one man



At the top is the Hand-y signal; at the bottom, the 1918 Sunderman carbureter, designed for low-grade fuel



An automatic voltage regulator that controls the flow of current to the headlights

Helping Henry

Helping Henry is the name of a new device in the form of a jack and pulley unit upon which the Ford car or any other car for that matter can be lifted readily, affording a means of driving corn shellers, pumps, drill presses, concrete mixers, saws, threshers, feed grinders, etc. All the drive of the car comes through the thread of the tire and drives the Helping Henry. As the car is raised by the jack, it is also pulled backward until the pressure of the tires against the drive wheels of the device is about 25 lbs. It is made up of a channel iron frame, malleable castings and bearings with ball and socket, self-aligning type made of high-speed babbitt. Oiling is taken care of by large grease cups. The weight complete is 135 lb. Auto Power Co., LaPorte, Ind.

Voltage Regulator

The Aske automatic voltage regulator controls the flow of current to the headlights and is designed for use on Ford cars of 1915 and later models. The device can be attached in a few minutes. It is attached by four screws to the dashboard under the hood and connected in the circuit between the magneto and the headlights. It works automatically and requires no batteries or switch by which to turn it on and off. If one lamp filament burns out, the regulator will control the current so that just the proper amount reaches the other lamp without increased voltage. A dimmer also can be supplied. Price, regulator, $5; dimmer, $1. Aske Automatic Voltage Regulator Co., Duluth, Minn.

Sunderman 1918 Carbureter

Sunderman announces its self-adjusting vacuum carbureter for the 1918 season. Deliveries on this new model will begin in May, 1917. It is merely a refinement of the present type of Sunderman and the principle claim for it is that it was designed and developed for low-grade fuel and feeds the proper amount of pure, dry gas to each cylinder through its compensating vacuum features. It is simplicity itself, being made of sixteen parts and among these there are no wearing parts. It is regulated by different sized jets which are specially made for different makes of cars. The Ford and Metz style sells for $5 and the other sizes for $6.50. Sunderman Corp., Detroit.

From the Four Winds

PLEASURE CAR MAY PLOW OWN PATH—Through the invention of the motor car snow plow shown here it is now possible for the pleasure car or truck to plow its own path through roads otherwise impassable and to furnish safe and clear traction for the wheels. If the plow is not needed, it can be uncoupled from the end of the bumper, the ends of the bumper turned up and caps screwed on the ends. The plow clears the track where the wheels run only. They are attached to be flexible, and an adjustment permits raising and lowering. Spiral springs allow for road variations, and a runner guard prevents the plow from running into the road bed. The invention is that of Claude C. Hyde, Otisville, N. Y.

HERE'S a County for You — Vermilion County, Illinois, has ordered 190,000 barrels of cement for concrete road construction that is now in progress.

To Build 12-Mile Brick Road—The commissioners of Noble County, Indiana, will consider bids for the construction of 12 miles of brick pavement at about $16,000 a mile at the March term of court.

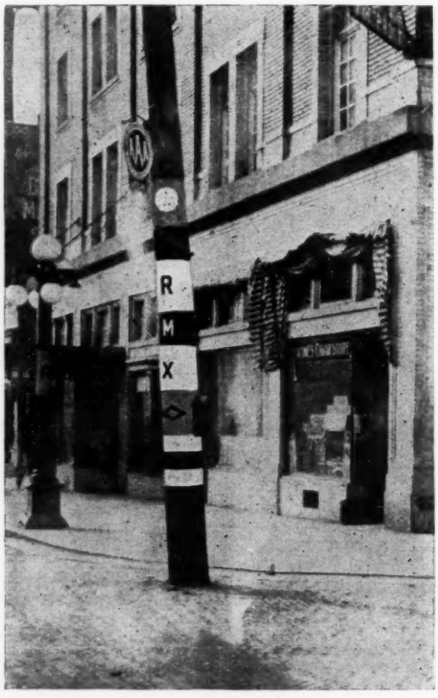
Wyoming Wants Highway Department—A bill has been introduced into the Wyoming legislature to provide a state highway department. The primary object is to make Wyoming eligible for the road funds authorized by the Federal Aid Act.

Pennsylvania Dealers Organize—The dealers of Adams County, Pennsylvania, have formed an organization. The following officers were elected: President, Frank R. Peckman; vice-president, S. Gray Bigham; secretary, W. I. Oyler, and treasurer, George Eberhart.

Wants Gasoline Cost Explained—Investigation why gasoline costs 5 cents more a gallon in Ohio than in Indiana and Michigan is demanded in a resolution by Representative Chester of Paulding County. He declares Ohioans the last two years paid $10,000,000 more for gasoline than they would have done in either of the other two states.

May Unite Historical Interests—Places of historic interest in Minnesota, marked with state monuments, are to be linked by a new trail, to form which a meeting is to be called in the summer. The plan is to begin the trail at Camp Release near Montevideo and end it at Traverse des Sioux or Mankato. New Ulm, Fort Ridgely, Birch Coolee and other points where Indian battles centered would be on the route.

New Mexico Improves Roads—The county commissioners of Grant county, New Mexico, have made arrangements to turn over to the state highway department $6,600 now in the Mogollon road fund, together with the proceeds of this year's levy, $8,000, which, together with the $10,000 left in the Silver City-Tyrone fund, will be expended by the state engineer on the scenic highway between Silver City and Cliff on the Mogollon road. Of the proposed Lincoln county road bond issue, $4,000 will be spent on the road from Corona to Carrizozo; $1,000, White Oaks to Carrizozo and Jacarilla; $3,000, Lincoln to Arabella; $1,500 in Devil's Canyon, $3,500 on the Alto-Nogal road, and $500 on the Angus-Capitan road, while the remainder of the $55,000 bond issue will be spent on other highways.



POLE BEARS EIGHT EMBLEMS—This telephone pole at the Jefferson Hotel, corner Washington and Dubuque streets, Iowa City, Iowa, has perhaps the distinction of bearing more important tourist road marks than any similar pole in the world. The markings from top to bottom are: American Automobile Association, the Kansas City and Gulf, the Red Ball, the Black Diamond, the River-to-River, the M. & M., the Red Cross and the Burlington Way, or Orange and White.

Four Miles of Concrete Road—Thurston County, Wash., is the first county in its state to receive Federal Aid in hard-surfacing roads. It will get $28,000 and is to build 4 miles of concrete road 20 ft. wide.

Asks Abolition of Speeder Fees—According to S. Boyer Davis, president of the Automobile Club of Philadelphia, there are more speed traps maintained in Atlantic County, N. J., than in the whole of Eastern Pennsylvania; but, in scoring all such traps, Mr. Davis asks that the Pennsylvania and New Jersey laws be amended to provide that no constable, deputy sheriff or other peace officer shall share in the fine imposed on speeders. Maryland already has such a law.

Jacksonville Has Unique Club—An organization composed exclusively of visitors to Jacksonville, Fla., recently completed the first year of its existence and is now assured of permanence as a unique organization. The name of the organization is the Tourist Club, and its members are from every section of the country. It was organized by the Jacksonville Convention and Tourist Bureau, where the meetings of the club are held weekly. The organization has served to bring hundreds of visitors together and to provide them with entertainment and friendship, while it has been of big service to the city by making boosters of many who would scarcely have been interested in Jacksonville.

Co-operative Delivery Discussed—The retail grocers' association of Decatur, Ill., has been holding a series of meetings to discuss the co-operative system of delivery with motor cars. Champaign and several other cities have made a success of the plan, and it was decided to send a delegation to each and report upon the workings of the system with the expense to each member as compared to the present cost with individual delivery. If the Decatur business men decide to adopt the new plan a central depot will be rented and a battery of cars purchased. By assigning one car to a certain district it is believed the merchants will reduce their present expense a great deal.

It is claimed in Champaign that the system greatly expedites deliveries as well as reducing costs and is giving entire satisfaction not only to the dealers but to patrons as well.

Jersey Fees Near Million—By the turning over to Comptroller Edwards of a check for $912,522.57, Motor Vehicle Commissioner William L. Dill indicates that the New Jersey motor vehicle fees for January will total more than $996,000.

Good Roads Meeting April—The annual meeting of the United States Good Roads Association will be held in Birmingham April 17-20. The first 2 days of the meeting will be devoted to the work of the association, while the third will be used for sessions of the Bankhead Highway Association. The fourth day will be occupied by a general good roads meeting. A show of materials and machinery will be one of the features of the meeting.

Makers to Help Advertise City—The Wisconsin Motor Mfg. Co., A. O. Smith Corp., Gemco Mfg. Co., Sterling Motor Truck Co., and Cutler-Hammer Mfg. Co. are among the twenty-five large Milwaukee industrial corporations which have contributed $1,000 each toward a fund being raised by the Milwaukee Forward League to advertise the city. The League will spend $50,000 or more in purchasing advertising space in magazines and other publications of national circulation.

$600,000 May Free Toll Roads—The commission appointed by the New Jersey legislature to look into the advisability of the state purchase of toll roads and bridges has recommended that $611,085 be appropriated for this purpose. The roads and bridges to be bought are: Gloucester turnpike, $68,000; Bridgeton-Millville turnpike, $18,000; Marlboro-Quinton turnpike, $10,000; Ocean City-Somers Point bridge, $271,639; Long Beach bridge, $93,446, and the Toms River-Seaside Heights bridge, $150,000.

Car Herds Ostriches—A flock of Nubian ostriches at the Cawston ostrich farm in Los Angeles, Cal., became excited recently and stampeded. Nobody seemed able to quiet them or control them. Finally, Jonathan S. Dodge, owner of the farm, suggested the men use the Inter-State car parked nearby. The driver made several trips around the inclosure to head the birds off against a high fence, but the flock was quieted. The uneveness of the ground, trees and feed troughs made travel uncertain and added to the excitement of the job.

New Jersey Wants New Commission—A bill is to be introduced in the New Jersey legislature to provide a state highway commission of eight men to replace the present commissioner. These men would serve without pay and would appoint a state highway engineer who would have complete charge of administration of the department. The plan is to ignore the Egan bill, which provided for a $7,000,000 bond issue, and to pass another bill for the levy of a special tax for roads. The bill proposes to raise $3,000,000 a year for five years. Motor car fees and fines would be put in repairs and construction.

Minnesota May Raise Fees—Much motor legislation is before the Minnesota legislature now. Bills have been introduced to raise the motor car registration fee to $5 a year and motorcycle fee to $3, to deprive drivers convicted of intoxication while driving of license for three months; to register and preserve highway trails; to make it a felony to steal a car; to make possession of car with altered factory numbers prima facie evidence of theft; to tax 25 cents per horsepower and 25 cents per 100 lbs. on motor vehicles, to be in lieu of other taxes on the vehicles. A dimmer bill has been offered, prohibiting use of lights which project more than 3 ft. above the surface of the road 75 ft. ahead of the car, exempting fire apparatus and publicly owned vehicles, and providing for examination of lights by county sheriffs and a fee of 25 cents for certificate of examination.

Old Tires for Red Cross—Motorists in Winnipeg are being asked by the Winnipeg Automobile Club to save their old casings and tubes for the benefit of the Canadian Red Cross society.

Loops the Loop on Skid—When his car skidded on the icy road, Raymond Miller, Jobstown, N. J., escaped without a scratch, though his car left the road and turned a series of somersaults down a steep embankment. The car was wrecked.

May Protect Serial Number—The Wisconsin Legislature is considering a bill which places a penalty of a fine of not more than $200 or a jail term of not to exceed six months on conviction of the charge of destroying or defacing the manufacturers' serial mark on motor vehicles of any kind.

May Connect Montreal and Vermont—A movement is being made to get a highway from Montreal to St. Albans, Vt., which would tap a lot of tourist country. The Business and Professional Men's Association of St. Albans has taken the matter up with residents of St. Johns. Now they are after the Automobile Club of Canada, and the president has written to G. A. McNamee suggesting that a deputation of six or eight members visit St. Albans to meet the representatives of the association and some men from St. Albans to discuss the most feasible route and the best method of obtaining a first-class highway connecting Montreal with St. Albans and points on the west side of Lake Champlain down through to the Berkshire Hills and New York.

Millions for Roads—After the $75,000,000 appropriated by the Government is added to the sum total of road money to be spent by the states, the grand total of $352,000,000 is reached. For, among issues we have these that either have been voted or are being agitated: Pennsylvania, $50,000,000; Illinois, $60,000,000; Colorado, $50,000,000; New Jersey, $7,000,000; Louisiana, $20,000,000; and California, $15,000,000.

Roads May Help Canadian Labor—A deputation consisting of representatives of the various provincial governments, returned soldiers' associations, labor and other organizations interested in the foundation of a National Labor Bureau to deal with the labor problem at the close of the war will wait on the federal government in Quebec City soon. Several delegates will be from Montreal, and the president of the Dominion Good Roads Association, J. Duchastel, of Outremount, probably will represent the congress which last year passed a resolution endorsing the proposal.

Texas Considers Highway Commission—The State Highway Commission Bill has passed the Texas House of Representatives with only one amendment. This amendment provides that the revenues to be obtained from taxing motor vehicles shall be apportioned equally between the county from which the amount is derived and the state, whereas the original bill made a division of 33⅓ per cent to the county and 66⅔ per cent to the state. Motor vehicles are taxed on their horsepower, and it is estimated that the average tax per vehicle will be about $10 per annum. Inasmuch as there are estimated to be at this time approximately 225,000 motor vehicles in Texas, the revenue to be derived from this source will amount to $2,225,000 per annum, all of which will go towards highway building and improvements.

Coming Motor Events

RACES
—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

†A. A. A. championship events for 1917.

SHOWS

Feb. 24-March 3—Newark, N. J.
Feb. 24-March 4—Atlanta, Ga.
Feb. 24-March 6—Brooklyn, N. Y.
Feb. 26-March 3—Omaha, Neb.
Feb. 26-March 3—Great Falls, Mont.
Feb. 26-March 3—Utica, N. Y.
Feb. 26-March 3—Charleston, S. C.
Feb. 26-March 3—Wilkes-Barre, Pa.
Feb. 26-March 3—Utica, N. Y.
Feb. 28-March 3—La Fayette, Ind.
March 1-3—Urbana, Ill.
March 3-5—Green Bay, Wis.
March 3-10—Boston.
March 3-10—Washington, D. C.
March 5-10—Bridgeton, Conn.
March 5-10—Parsons, Kan.
March 5-10—Jamestown, N. Y.
March 5-12—Birmingham, Ala.
March 6-10—Fort Dodge, Iowa.
March 7-10—St. Joseph, Mo.
March 7-14—Canton, Ohio.
March 12-14—Fort Worth, Tex.
March 13-16—Vancouver, B. C.
March 13-16—Fargo, N. D.
March 13-17—Denver, Colo.
March 14-17—Davenport, Iowa.
March 14-17—Kenosha, Wis.
March 14-17—Mason City, Iowa.
March 17-24—Pittsburgh, Pa.
March 19-24—Paterson, N. J.
March 19-24—Cedar Rapids, Iowa.
March 21-24—Trenton, N. J.
March 27-31—Clinton, Iowa.
March 27-31—Deadwood, S. D.
April 4-7—Stockton, Cal.

The Show Circuit

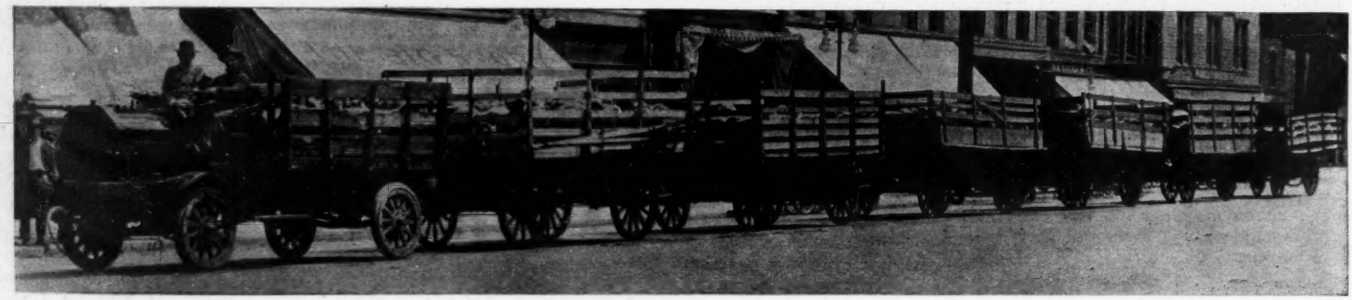
Fort Worth to Have Show—A show will be held at Fort Worth, Tex., in connection with the Fat Stock Show March 12-14. Many Dallas dealers have contracted for space in the coliseum. Thousands of visitors every year see this fat stock show. Tom Cooper of Fort Worth is in charge.

10,000 at Racine Show—The fifth annual motor show at Racine, Wis., which was held Feb. 15-19, attracted more than 10,000 people, or a fourth of the total population of Racine. Thirty-one different makes of cars were exhibited, among them the Mitchell and Case, made in Racine. The show was managed by Charles A. Myers.

Des Moines Truck Dealers' Show—The first annual Des Moines motor truck show was staged on the same days as the motor car show, by the motor truck dealers of Des Moines. Two trucks, a 12,000-lb. Mack and a Little Giant, made an endurance run from Chicago to be exhibited at the show. The truck display was in the Des Moines auditorium, and all space was sold. George Hippee of Des Moines managed the show.

Ninety Cars at Duluth Show—Ninety gasoline and electric cars and thirty trucks and accessories were displayed at the show in Duluth last week. The pleasure cars were exhibited on the main floor, and the trucks and accessories in the basement. The armory, in which the show was held, was decorated with American flags and colors and contained a large portrait of George Washington, whose birthday came during the week. The show was Duluth's third annual show and was a third larger than the exhibition of last year.

Among the Makers and Dealers



TRUCK HAULS 300 SHEEP—A solution of country transportation problems is offered by this Duplex truck, equipped with Firestone single tread solid tires, hauling a train of six wagons loaded with 300 sheep into Charlotte, Mich. The truck has traveled 10 miles over rough country roads to reach Charlotte. The weight of the load was more than 20 tons. The sheep weighed 15 tons, and the wagons, 9000 lbs.

CANADIAN Ford Tractor Incorporates—The Ford Tractor Company of Canada, with headquarters at Toronto, Ont., has incorporated for $10,000,000.

Gilbert to Monitor Company—H. L. Gilbert, former director of the Ohio Buick Co., Columbus, Ohio, has been elected a director of the Monitor Motor Car Co.

Lumpkin Becomes Advertising Manager—Walter H. Lumpkin, for several years with the Silvex Co., New York, has been appointed advertising manager of the concern.

Lloyd With Pilot—Geo. H. Lloyd has joined the staff of the Pilot Motor Car Co. of Richmond, Ind. Mr. Lloyd was formerly sales manager for the Velie company and more recently has been engaged in business in Kansas City.

Prochaska to Sell Bramford—Carroll W. Prochaska, formerly president of the Whalen Eng. Co., New York, distributor for the F. A. C. carbureter and Alisco shock absorber, has joined the Holt-Welles Co., Inc., of New York, sole agent for the Bramford carbureter, as assistant sales manager.

Covert Gear to Transfer Offices—The Covert Gear Co., Inc., transmission maker, will move its sales, engineering and service departments from Lockport to Detroit today. The three departments will be under the direction of A. A. Gloetzner, sales manager and chief engineer. Correspondence relative to these departments will be handled through Detroit instead of through the factory at Lockport, N. Y.

Amazon Rubber Co. Incorporates—The Amazon Rubber Co., Columbus, Ohio, has been incorporated to take over the Amazon Tire & Rubber Co. The capitalization is $500,000.

Collier Company to Move—The Collier Motor Truck Co. capitalized at $150,000, will locate at Sandusky, Ohio. The removal will take place at once. The company employs 100 men.

To Move Engine Factory—The Simple Gas Engine Co., Ashland, Wis., has desired to move its plant and headquarters to Menasha, Wis., where a new plant will be erected at once. The company has leased the former Eureka cooperage as temporary headquarters.

Champion Motors Open Export Branch—The Champion Motors Co., Cleveland, Ohio, and Fulton, Ill., has opened an export branch in New Orleans. Ralph Appemon, a Pacific Coast aviator who has been in the service of foreign countries for three years, will be in charge.

American Motors Appoints Managers—W. H. Crowley, recently wholesale manager for the Saxon Motor Co. of New York, has been made a district sales manager for the American Motors Corp., Plainfield, N. J., for New York and Pennsylvania. Charles W. Govan has been made district sales manager for New England and Long Island. H. M. Applegate, formerly advertising manager of Lee tires, will manage advertising.

Kent Motors to Move Offices—The Kent Motors Corp. will move its general offices and organization from New York to Belleville, N. J., where its factory is located, today.

Apperson Plant Is Completed—The Apperson Bros. Automobile Co., Kokomo, Ind., has completed its new factory, and the plant now is in operation. The old buildings will be utilized, but practically all the manufacturing will be done in the buildings of the new group.

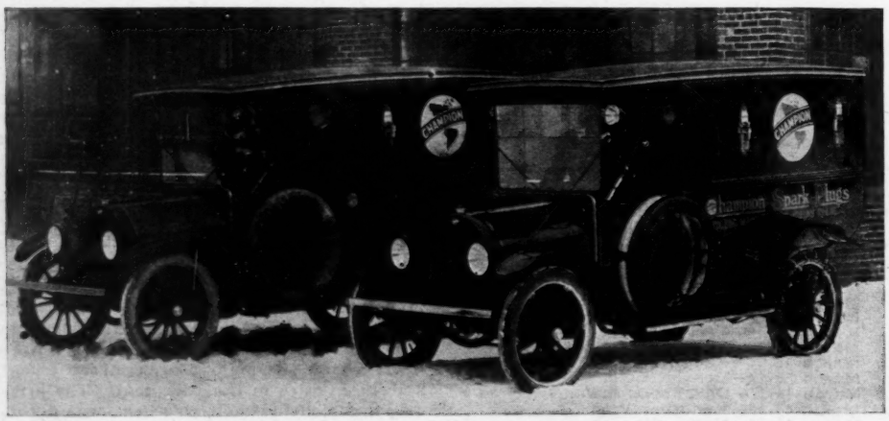
Moore Leaves Gramm-Bernstein—William H. Moore, who has been associated with the Gramm-Bernstein Co. at Lima, Ohio, for eight years, has resigned to join the forces of the Garford Motor Truck Co. He will be connected with the metropolitan district as Brooklyn sales manager.

Wilkins to State Agency—F. W. Wilkens, formerly with the Hupp Motor Corp., Detroit, has become general sales manager for the Edgar F. Sanger Co., Milwaukee, Wis., state distributor of the Steans-Knight and Hupmobile, which recently was incorporated for $75,000.

Warner Gear to Expand—The Warner Gear Co., Muncie, Ind., manufacturer of parts, as soon as the weather permits will begin the construction of new buildings and the installation of equipment to double its capacity. The company's capital stock has been increased from $500,000 to $1,500,000. The number of employes will be increased from 1000 to 2000 when the improvements are completed.

To Begin Truck Plant Soon—Ground will be broken soon after April 1 for the first unit of the new motor truck plant of the Winther Motor Truck Co., Kenosha, Wis. Plans now are being completed for the first shop building to be 110 by 400 ft. in size, one-story, of fireproof construction, with sawtooth roof. M. P. Winther is president and general manager.

Body Maker Uses Light Force—The Racine Mfg. Co., Racine, Wis., maker of motor car bodies, has been obliged to place its factory on a regular night shift to handle the orders for taxicab and other special bodies. The output has been increased to eighty touring car bodies and fifteen closed bodies daily. This concern is working on a renewal order of seventy-five taxicab bodies for the Walden W. Shaw Livery Co., Chicago and New York. The company also is licensed to manufacture Springfield closed bodies. It



CARS ADVERTISE CHAMPION SPARK PLUGS—The Champion Spark Plug Co., Toledo, Ohio, has been using a fleet of advertising cars this winter, and two of them were sent to the Pacific Coast to help display the plugs at the various motor shows. The cars left Toledo Jan. 15, expecting to reach San Francisco, Feb. 12, the opening day of the San Francisco show. The cars, Overlands, were equipped with complete repair outfits and aids to meet the ruts and snow drifts of the long journey.

has been found necessary to eliminate all custom work to accommodate the demands of the regular contracting customers.

Pierce to Cleveland Branch—Robert B. Pierce, formerly chief adjustor for the Kelly-Springfield Tire Co., Akron, Ohio, has been appointed manager of the Cleveland branch.

Brown Gets Elgin Office—Will H. Brown, Indianapolis, Ind., vice-president and assistant general manager of the Willys-Overland Co., has been made director of sales of the Elgin Motor Car Corp. of Chicago.

Dale Body Co. Elects—L. J. Eshleman heads the Dale Body Co., the new auxiliary to the Allen Motor Co., Fostoria, Ohio. The other officers are: vice-president, Fred Freese; second vice-president, Frank Kingseed; and treasurer, M. A. Thomas.

U. S. L. Makes Appointments—J. A. White, formerly manager of the Boston and Chicago branches of the U. S. Light & Heat Corp., has been appointed manager of sales, battery department, Niagara Falls, N. Y. W. W. Hasley has been appointed manager of the New York sales office.

Schrenkeisen Becomes Sales Manager—Ralph R. Schrenkeisen has been appointed sales manager of the Randall Motors Corp., New York, eastern distributor for the Grant Six. Mr. Schrenkeisen has been with the Packard Motor Car Co. and the Chalmers Motor Co. during his ten years' experience in the trade.

Six Engineers Join McQuay-Norris—J. H. Bishop, P. T. Egbert, Arthur F. Frost, J. H. Griffith, George Heidenreich and G. T. Parsons have joined the sales force of the McQuay-Norris Mfg. Co., St. Louis, Mo. They will be with the Kansas City, New York, Dallas, Pittsburgh, Cincinnati and New York offices, respectively.

Sets Truck Unit Output—The Ton-A-Ford Co., Racine, Wis., organized to engage in the manufacture of light motor trucks embodying the Ford chassis, is now in its new plant, which is the buildings formerly occupied by the Perfex Radiator Co. The daily capacity will be twenty-five to thirty units. The Ton-A-Ford extension chassis retails at $345.

Pennsylvania Rubber Elects—Officers for the Pennsylvania Rubber Co., Jeanette, Pa., were elected for the coming years as follows: President and treasurer, H. Wilfred DuPuy; vice-president, Charles M. DuPuy; general manager, Seneca C. Lewis; secretary, George W. Shiveley; assistant treasurer, Charles G. Morrill. A quarterly dividend of 1¾ per cent on preferred and 1½ per cent on common has been declared, payable March 31 to stock of record March 15. The company is building an addition to its shipping department, which will double the capacity.

Drouillard Gets Maxwell Superintendency—F. B. Drouillard has been appointed superintendent of the new Maxwell plant in St. Louis.

Horn Is District Manager—F. Y. Horn has been appointed district manager for the Amazon Rubber Co., Akron, Ohio. He will have headquarters in Chicago.

Frost Gear Co. Meets.—Officers and directors for the coming year have been elected by the Frost Gear Co., Jackson, Mich. The officers are as follows: President, E. E. Frost; vice-presidents, M. C. Townley and James Heaslet; secretary, Robert Smith; treasurer, A. S. Glasgow.

Ostrom Leaves Locomobile—Claude C. Ostrom, purchasing agent for the Locomobile Co. of America, has resigned to join the Paris Mfg. Co. of Reading and Detroit, maker of frames for the Locomobile company. Mr. Ostrom had been with the concern since 1910. He will be succeeded by J. E. Forgy.

Hess-Bright Opens Sales Branches—The Hess-Bright Mfg. Co., Philadelphia, Pa., has opened new branch sales offices in New York and Cleveland, Ohio. H. E. Brunner has charge of the New York office and is assisted by H. A. Fonda. The Cleveland office is under the direction of R. E. Clingan, assisted by Walter Rippien and M. S. McNay.

Manship to Philadelphia Branch—Mark C. Manship has been appointed manager of the Philadelphia branch of the Maxwell Motor Sales Corp. to succeed Leroy G. Peed, who has joined the Willys-Knight retail branch in New York as manager. Mr. Manship has been with the company five years and has served in practically every department.

Globe Truck in St. Louis—The Globe Motor Truck Co. has been incorporated in St. Louis and expects to produce about 1000 trucks this season. Joseph E. Eddy is in charge of sales and advertising, and F. M. Woodard, formerly with the Alter Motor Car Co., Plymouth, Mich., is in charge of production. The concern has a new factory at East St. Louis, Ill., with sales offices in St. Louis.

Nordyke & Marmon Makes Appointments—Walter M. Bieling has been appointed central states sales manager of the Nordyke & Marmon Co., Indianapolis, Ind., to sell cars in Ohio, Indiana, Kentucky and adjacent territories. He will have his headquarters at Indianapolis. H. H. Brooks, formerly with the Marathon Motor Car Co., Nashville, Tenn., has been appointed assistant sales manager. Gerald Fitzgerald, formerly manager of the Minneapolis branch of the Remy Electric Co., Anderson, Ind., has joined the sales force.

Transmission Company Organized—The Campbell Transmission Co. has been organized at Buchanan, Mich., with a capital of $250,000.

Dyneto Electric Co., Reorganizes—The Dyneto Electric Co., Syracuse, N. Y., has reorganized as the Dyneto Electric Corp. with a capital of $500,000.

Premier Distributed in Detroit—The Henry L. Walker Co., Detroit, will handle the Premier car. This is the first agency for the new Premier product in Detroit. W. A. Sturgeon will manage the company.

Graham Joins Pierce-Arrow—George M. Graham has been appointed assistant commercial manager of the Pierce-Arrow Motor Car Co., Buffalo, N. Y. Mr. Graham has been with the Willys-Overland Co., Toledo, Ohio.

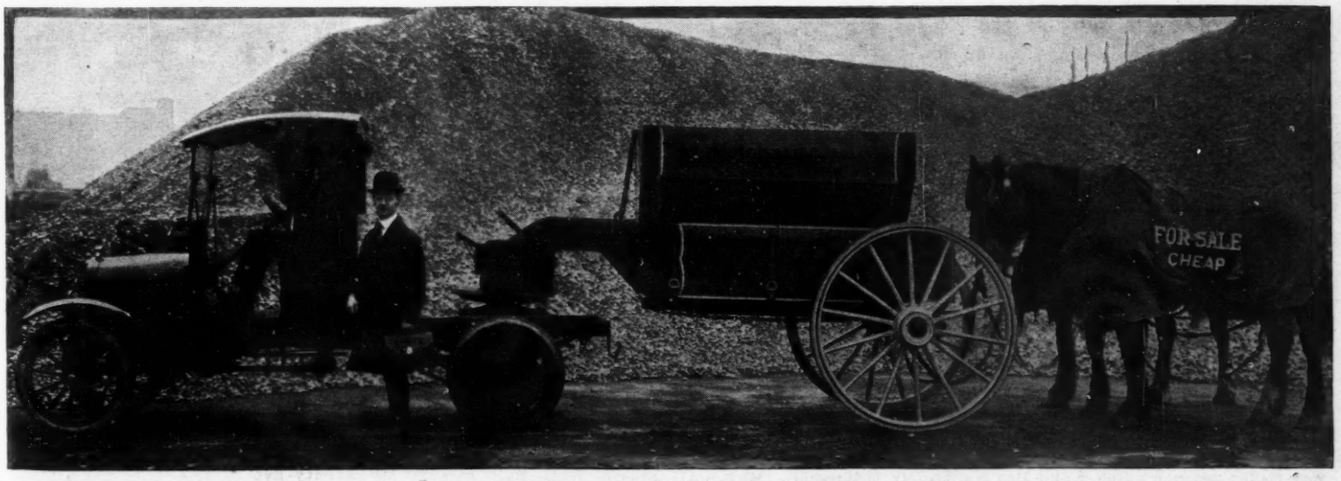
Slogan Serves as Address—To illustrate how well known the trade slogans of the makers become, a letter addressed merely to "Foreign Sales Manager, 'The Most Beautiful Car in America,' U. S. A.," reached the Paige-Detroit Motor Car Co., Detroit, without delay.

To Distribute Smith—McKinney-Fuller-Curtis Co., Grand Forks, N. D., has been appointed distributor for the Smith Form-A-Truck in North Dakota, Eastern Montana, parts of South Dakota and Wyoming and Western Minnesota. The firm has opened a new branch at Fargo, N. D., and is building at Grand Forks.

Fenton Succeeds Jones—Howard W. Fenton, formerly with the Remy Electric Co., Anderson, Ind., and the Nordyke & Marmon Co., Indianapolis, Ind., has been appointed advertising manager of the Empire Automobile Co., Indianapolis, Ind., to succeed Tom O. Jones, who resigned to join the staff of J. B. Crockett Co., exporter, New York.

Bradford-Ackerman Organized—A. H. Ackerman, formerly vice-president and general manager of the U. S. Light & Heat Corp., and C. C. Bradford, formerly sales manager of the same company, have formed the Bradford-Ackerman Corp., New York, and will represent makers of motor car accessories in domestic and export trade.

Tire Distributor Organized—The Weil-Wheaton Rubber Co. has been organized at Minneapolis, Minn., to distribute the tire made by the General Tire & Rubber Co., Akron, Ohio, in Minnesota. The company includes F. Weil, E. M. Wheaton and W. N. Hunkins. Mr. Hunkins and Mr. Wheaton were formerly with the Goodyear organiza-



HE WHO RUNS MAY READ—The sign, "For Sale Cheap," is bad for the horse but good for the motor industry. You see here one of the Union truck attachments, which, together with other motor car attachments, has taken the places of many teams in hauling rock, crushed stone and so on.

tion at Minneapolis. Mr. Weil was at one time assistant sales manager for the Republic Rubber Co.

Hunt Joins Stromberg Forces—Scott F. Hunt, an engineer with the Zenith Carburetor Co., Detroit, has resigned to join the organization of the Stromberg Motor Devices Co., Chicago.

Accessory Company Starts Manufacture—The Auto Specialty Mfg. Co., St. Joseph, Mich., has started work with 350 employes and will manufacture Bair-Bow springs, topholders, malleable iron parts, and castings.

National's Shipments Grow—The National Motor Car Corp.'s shipments in January were 100 per cent ahead of the corresponding month last year and 50 per cent ahead of the requirements to dispose of the year's output. The sales for the month of February, it was stated, would be correspondingly good.

Joins Export Business—Tom Jones, an old newspaper man who several years ago went around the world in a Hupmobile with Joseph R. Drake, president of the Hupp Motor Car Co., has resigned his position as advertising manager of the Empire Automobile Co. and has sailed for Europe to join a motor car export company.

Frost with Chalmers—A. G. Frost has joined the sales staff of the Chalmers Motor Co. and will do special sales work under the direction of E. C. Morse, vice-president and general manager. Mr. Frost is one of the veterans of the Broadway, New York, motor car district and was associated with Mr. Morse when the latter was with the E. R. Thomas Motor Car Co.

Saxon Output Growing Rapidly—The Saxon Motor Car Corp. is producing seventy-five cars daily and will soon reach the 100 mark. It has recovered quickly from the effects of the recent fire.

Disbrow Officials Appointed—W. D. Callinan has been made first vice-president of the Disbrow Motors Co., Cleveland, Ohio. Edward P. Strong is second vice-president, and Morris Becker, secretary and treasurer.

Woodside Is Made Superintendent—William P. Woodside has been appointed superintendent of plant 4 of the Studebaker Corp. Mr. Woodside was formerly with the Crucible Steel Co.

Ford Building in N. J.—The Ford Motor Co. will give up its Long Island City plant in about a year. The company has started to build its plant at Kearny, N. J., and is now laying the foundation for a dock for export business. When this plant is completed operations in the Long Island City plant will be transferred to Kearny.

Record in Sales and Profits—The Detroit Steel Products Co. in its report to stockholders, at the recent annual meeting, showed that the sales and profits for 1916 made the company's most successful year and that the outlook for 1917 points to a still greater prosperity. The sales for January of this year total 100 per cent more than the sales for 1910. The company is erecting several buildings. An extra dividend of 10 per cent was declared in addition to the regular annual dividend of 7 per cent.

To Build Models in Indianapolis—W. A. King, production manager of the Tulsa Automobile Corp., Tulsa, Okla., will build his model cars in Indianapolis.

Fisher Tool Holds Meeting—The Fisher Tool & Supply Co. has elected Roy Fisher president; Ralph Hoagland vice-president and sales manager, and Herman Fisher secretary and treasurer for the coming year.

Texas Plant Starts in March—The plant of the Chevrolet Motor Co. at Fort Worth, Tex., will commence operations this month. The Chevrolet company expects to produce 540 cars a day by that time, its daily output now being 400 cars. The schedule calls for 600 cars a day by July 1.

Offers Stock to Public—The Biggam Trailer Co., organized with an authorized capital stock of $200,000, of which $150,000 is common and $50,000 preferred, is offering its stock to the public on a basis of two shares of preferred to one share of common. Par value of the stock is $10 per share.

Drives Fifty Cars—M. V. DeForrest, Sharon, Pa., drove fifty cars from Flint, Mich., to Sharon last week and came back to Flint with fifty men, planning to make a similar driveaway. DeForrest is the Buick distributor at Sharon and has been unable to get cars because of the congested freight situation.

Akron, Ohio—O'Neil Storage Battery Co.; capital stock, $10,000; to deal in batteries; incorporators, W. P. O'Neil, George C. Austin, S. A. O'Neil, E Brennan and I. A. Austin.

Akron, Ohio—Amazon Rubber Co.; capital stock, $500,000; to manufacture tires; incorporators, Louis J. Schott, Louis F. Smith, Claud E. Bettler, J. Henry Adams and Frank B. Burch.

Chicago—Commercial Motors Co.; capital stock, $200,000; incorporators, C. W. Greenfield, M. E. Rising and E. L. Harpham, Jr.

Cedarburg, Wis.—Boerner Auto Co.; capital stock, $20,000; to deal in new and used cars; operate garage, repair shop, etc.; incorporators, G. A. Boerner, W. R. Boerner and R. V. Boerner.

Cleveland, Ohio—Gordon Square Auto Co.; capital stock, $10,000; to deal in motor cars and supplies; incorporators, C. W. Thomas, W. F. Maurer, John F. Wilson, E. R. Dolin and A. L. Maurer.

Cleveland, Ohio—Mertz Co.; capital stock, $100,000; to deal in motor cars; incorporators, William Rothenberg, William R. Miller, I. E. Guentzler, P. Schulman and E. E. Gibson.

Cleveland, Ohio—Mall Motor Co.; capital stock, $10,000; to deal in motor cars; incorporators, W. C. Malin, J. A. Cline, H. M. Siering, M. A. Patterson and J. C. Logue.

Columbus, Ohio—Columbus Distributing Co.; capital stock, $5,000; to sell oils; incorporators, Frank H. Lawell, Jacob Renner, John A. Howe, Howard F. Ford, C. O. Walker and W. T. Foster.

Cleveland, Ohio—Gordon Square Auto Co.; capital stock, $10,000; incorporators, C. W. Thomas, W. F. Maurer, John F. Wilson, E. R. Dolin and A. L. Maurer.

Cleveland, Ohio—Clouse Tire & Repair Co.; capital stock, $25,000; to sell and repair tires; incorporators, Mont Clouse, Alex W. Gillespie, James E. Phillips, Joshua M. Myers and I. Lee Smith.

Cleveland, O.—Beckenbach Auto Livery Co.; capital stock, $10,000; incorporators, John Beckenbach, P. Kueberle, Lewis Drueker, B. D. Zieve and Arthur A. Naiger.

Cleveland, Ohio—Michigan Oldsmobile Co.; capital stock, $250,000; to make and sell motor cars; incorporators, Fleming H. Crew, G. M. Gallagher, Richard H. Lee, Frank W. Cadwell and M. A. Marquard.

Cincinnati, Ohio—Premier Auto Repair Co.; capital stock, $10,000; incorporators, Anton Artner, Esther Stern, Phiness S. Phillips, H. W. Mesloh and August W. Bruck.

Canal Fulton, Ohio—Keller Motor Co.; capital stock, $10,000; to deal in motor cars; incorporators, A. P. Keller, O. F. Keller, C. W. Keller, Code Keller, Margaret Keller and Iloa Keller.

Dodge City, Kan.—Auto Supply Co.; capital stock, $20,000; incorporators, T. H. Spaulding, A. J. Jackson and I. B. Jackson.

Recent Incorporations

Dayton, O.—Maxfier Auto Truck Sales Co.; capital stock, $10,000; incorporators, George H. Connelley, Herbert Balle, J. L. Miller, Wm. P. Jenkins and J. Weaver.

Dover, Del.—Landover Auto Truck Co., to deal in and with attachments for motor cars and trucks, etc.; capital stock, $300,000; incorporators, Arthur W. Britton, Samuel R. Howard and L. H. Gunther.

East Palestine, Ohio—National Tire & Rubber Co.; capital stock, $1,000,000; incorporators, R. E. Waldo, H. A. Clark, H. B. Callahan, W. A. Sturgeon and H. C. Johnston.

Fostoria, Ohio—Auto Truck & Storage Co; capital stock, $10,000; to deal in trucks; incorporators, N. M. Watson, R. O. Stiger, W. L. Knowles, L. L. Watson and W. M. Witherspoon.

Harrisburg, Pa.—Shafer-Oliver Automobile Co.; capital stock, $5,000; incorporators, G. L. Oliver, A. V. Shafer and A. C. Snively.

Huntington, W. Va.—Gem Garage Co.; capital stock, $10,000; incorporators, M. J. Ferguson, S. V. Williams, C. H. Williams, G. E. Merriman and L. L. McClure.

Lockport, N. Y.—Harrison Radiator Corp., to manufacture radiators, parts and accessories; capital stock, $1,050,000; incorporators, Beononi Lockwood, F. A. Gaynor and R. G. Good.

Louisville, Ky.—Central Motor Car Co.; capital stock, $15,000; incorporators, Allen H. Douglas, Robert L. Thomas and Horace C. Dunavent.

Memphis Tenn.—Falcon Motor Car Co.; capital stock, $150,000; incorporators, J. G. Hamblett, E. E. Karlson, J. R. Manley, G. A. McGill and C. F. Kessler.

Milwaukee, Wis.—Achen Motor Co.; capital stock, $45,000; incorporators, I. W. B. Achen, Arthur Gardiner, Robert Gardiner and Hundin Boorse.

Milwaukee, Wis.—Teutonia Motor Car Co.; capital stock, $5,000; incorporators, Hugo Walter, A. C. Neitzel and Anthony Bertram.

Macon, Mo.—Reichel Motor Co.; capital stock, $40,000; incorporators, Theodore Reichel, John W. Hatton and D. W. Acuff; to manufacture and deal in motor cars.

Marshall, Mich.—All Season Body Co.; to manufacture detachable motor car tops and accessories; capital stock, $500,000; incorporators, J. A. McAvoy, Mansel Hackett, Ralph Trese and F. R. Bothwell.

New Philadelphia, Ohio—Old Central Garage Co.; capital stock, $10,000; incorporators, R. O. Finger, C. O Hawk, Fred Schussler, Mrs. Margaret Finger and Mrs. Bernice Hawk.

Newark, N. J.—New Jersey Electric & Auto Supply Co.; to manufacture electrical supplies; capital stock, $25,000; incorporators, Jerome Rafferty, H. L. Doolittle and M. B. Doolittle.

Omaha, Neb.—Western Motor Car Co.; capital stock, $20,000; incorporators, Charles Hannan, Jr., W. S. Johnson and E. V. Abbott.

Peoria, Ill.—Crescent Auto Co.; capital stock, $10,000; incorporators, E. T. Knudsen, G. W. Hubbard and H. J. Ingram.

Pittsburgh, Pa.—Bigelow Motor Sales Co.; capital stock, $15,000; incorporators, George Bich, W. A. Bigelow and John E. Lauer.

Pittsburgh, Pa.—Allegheny Auto Co.; capital stock, $50,000; incorporators, Leo D. Ker, Albert T. Lewis, J. R. Haney and John A. Mancoes.

Peoria, Ill.—Auto Kot Co.; capital stock, $10,000; to deal in motor cars and supplies; incorporators, G. H Page, J. W. Winzeler and G. T. Page.

Rutherford, N. J.—Sterling Tire Corp.; capital stock, $2,500,000; to manufacture, purchase, hold, own and deal in rubber tires, vehicles, etc.; incorporators, Joseph A. Miller, Otto Basten and Barrett Green.

Rock Hill, S. C.—Anderson Motor Co.; Capital stock, $1,500,000; incorporators, J. B. Johnson, J. G. Anderson, T. L. Johnston, J. M. Cherry, Alex Long and J. W. O'Neal.

Seattle, Wash.—Parsons Motor Car Co.; capital stock, $20,000; incorporators, J. W. Parsons, J. Y. Waldrip and J. H. Buckland.

St. Louis—D. C. L. Selling Corp.; capital stock, $6,000; to deal in motor cars and accessories; incorporators, Ernest F. Oakley, Jr., Wm. Logan and Walter Mellier.

Steubenville, Ohio—Travelers Garage & Automobile Supply Co.; capital stock, $25,000; to deal in motor car supplies; incorporators, Jesse E. Cohen, Ralph B. Cohen, George Sampson, Morris Finesman and Frank Grossman.

St. Louis, Mo.—Combination Auto Lock Co.; capital stock, $10,000; incorporators, W. B. Balthaser, George A. Abel and H. F. Foulsing.

Seattle, Wash.—Parsons Motor Car Co.; capital stock, $20,000; incorporators, J. W. Parsons, J. Y. Waldrip and Jesse Buckland.

Toledo, Ohio—Kibby & Pierce Co.; capital stock, $20,000; motor cars; incorporators, Vernon G. Kibby, Arthur H. Pierce, Clara M. Valentine, R. Lucile Elton and Wesley S. Thurstin, Jr.

Toronto, Ont.—Canadian Auto Sales Co.; capital stock, $40,000; incorporators, R. D. Hume and J. J. Greenan.